

JICA assisted Capacity Development on Lagunbyin Water Treatment Plant  
under Greater Yangon Water Supply Improvement Project implemented by

添付資料-9セミナー資料及び出席者リスト

Name List for Seminar (Civil) Attendance

No	Name	Designation	Seminar	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
			Year	2015														
			Month	Mar	Mar	Mar	Mar	Mar	May	Jul	Sep	Oct	Nov	Jan	Mar	May	Jul	
			Day	10	11	12	14	18	21	15	17	10	12	21	18	27	10	
HO=Head Office		S=Site		S	S	S	S	S	S	S	HO	HO	HO	HO	HO	HO	ME	
	TECI																	
1	Minoru IKEI	Chief		*	*	*	*	*		*	*						*	*
2	Junjiro AKIBA	Civil		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
3	Koichi NAOI	Electrical										*						
4	Shinichi OSAKA	Mechanical							*			*						
5	U Pyi Kyaw Hein	AE-Civil							*	*	*	*	*	*	*	*	*	*
	YCDC																	
6	U Myint Oo	CE									*							
7	U Myint Zaw Than	DCE		*	*									*	*			*
8	U Myo Thein	DCE										*						
9	U Thet Lwin	ACE										*	*	*	*	*		
10	U Khin Mg Phu	ACE										*						
11	U Myint Sein	ACE											*					
12	U Aung Khin Zaw	ACE													*			
13	Daw Thwe Naing Oo	ACE												*				
14	Daw Myint Myint Aye	ACE												*				
15	U Than Han	EE		*	*	*	*	*			*		*	*	*	*	*	*
16	U Zaw Minn	EE						*					*	*		*	*	*
17	U Soe Kyaing	EE							*				*	*	*	*	*	*
18	U Htin Kin Kha	EE										*		*				*
19	U Wai Lwin	EE										*	*					
20	Daw Myint Myint Soe	EE										*	*					*
21	U Tint Zaw	AE		*	*							*		*				
22	U Phone Naing	AE		*	*	*			*					*				*
23	U Min Thu	AE							*									
24	U Htay Naing	AE										*						
25	U Pyone Cho	AE										*						
26	U Zaw Oo	AE							*			*		*				
27	U Aung Htut Lin	AE												*	*			
28	Daw Ei Khing Mon	AE														*		
29	Daw Yu Yu Hla Baw	AE										*		*		*		*
30	U Zaw Min Htut	SAE		*	*									*	*			
31	U Aung Ko Ko Tin	SAE		*	*													
32	U Tun Tun Hlaing	SAE		*	*	*	*		*			*						*
33	U Kyaw Swar Min	SAE		*	*	*		*	*		*			*	*	*	*	*
34	U Tun Win	SAE		*	*	*								*	*	*	*	*
35	U Than Wynn	SAE			*	*	*	*	*			*	*	*	*	*	*	*
36	U Zin Min Latt	SAE					*	*	*	*	*	*	*	*	*	*	*	*
37	U Min Htut Naing	SAE								*	*			*				
38	U Aung Moe Kyaw	SAE											*					
39	U Mg Mg Thant	SAE											*					
40	U Zaw Win Aung	SAE														*		
41	U Saw Than Naing Oo	SAE											*	*	*	*	*	*
42	Daw Nyunt Nyunt Lwin	SAE												*				*
43	Daw Khin San Win	SAE											*					*
44	Daw Zin Mar Aung	SAE										*						
45	Daw Su Su Aung	SAE										*		*				
46	Daw Ya Min	SAE										*						
47	Daw Khin Than Oo	SAE										*						
48	Daw San San Htwe	SAE										*						
49	Daw Myat Hsu Hlaing	SAE										*						
50	Daw Naw Ehlinder	SAE											*					
51	Daw Khin Aye Aye Thet	SAE											*					
52	Daw Thin Thin Htoo	SAE											*					
53	U Aye Min	JE							*									
54	U Aung Kyaw Khing	Watches		*							*	*						
55	U Phyo Thar Kyaw	Watches		*		*	*	*	*									
56	U Sa Soe Min Soe	Watches									*							
57	U Nyein Chan Aung	Watches				*	*	*	*									
58	U Kyaw Myo Aung	Watches				*	*	*	*		*							
59	U Myo Thaw Tun	Watches				*	*	*	*	*								
60	U Ye Win Htun	Watches							*									
61	U Min Thet Zaw Oo	Watches								*								
62	U Thura Htwe	Watches								*								
63	U Mg Mg Aye	SAE																*
64	Daw Hwe Ni Aung	JE																*
65	Daw Moh Moh San	WA																*
66	Daw Phyo Po Po Thet																	*
67	Daw Aye Cho Sann	JE																*
68	Daw Ei Ei Nyein	WA																*
				11	10	10	8	9	14	5	8	12	15	20	15	12	19	

添付資料9-1

## Questionnaires at Seminar (14) 10-7-2015

### (A) Other Subjects You want to study

- (1) want to study mechanical & electrical works ----- 2 peoples
- (2) want to study planning and programing ----- 2 peoples
- (3) want to study safety and project management ----- 2 peoples
- (4) want to study environmental facts, finance and construction project ----- 1 people
- (5) want to study techniques and management of water resources ----- 2 peoples
- (6) want to study Japanese guide line for civil work, engineering manual book  
and "code" of works, design drawings and water resource management ----- 1 people
- (7) want to study technique of water and sanitation in Japan ----- 1 people
- (8) want to study quality control of water ----- 1 people
- (9) no comments ----- 9 peoples

### (B) Comment on the Seminar

- (1) very valuable and beneficial experience for YCDC ----- 3 peoples
- (2) get general knowledge ----- 5 peoples
- (3) want to study more and more from adviser ----- 1 people
- (4) knowing true and false, and good and bad for site engineers ----- 1 people
- (5) very effective and precious for the project ----- 1 people
- (6) come to complete and systemic engineering and know about safety first ----- 1 people
- (7) want to explain not only civil work but also mechanical and electrical works ----- 1 people
- (8) hope to distribute and share about technique and experience of JICA advisers --- 1 people
- (9) presentation level may be higher for YCDC engineers and they have started  
work on site with new knowledge ----- 1 people
- (10) completely valuable to YCDC ----- 1 people
- (11) site engineers had best information from presentation ----- 1 people
- (12) no comments ----- 4 peoples

### (C) Any Other Comment

- (1) YCDC wants JICA advisers to hold the same seminar frequently ----- 1 people
- (2) presentation may be better if there was a translator ----- 1 people
- (3) want to attend many times likely this seminar ----- 3 peoples
- (4) thank you for the presentation ----- 2 peoples
- (5) no comments ----- 14 peoples

**JICA assisted Capacity Development on Lagunbyin Water Treatment Plant  
under  
Greater Yangon Water Supply Improvement Project implemented by YCDC**

The Faculty of Civil Engineering by the School of JICA Advisors

This is to certify that

**U Pyi Kyaw Hein**

has completed Seminars

in the discipline of

**Project Management**

held during March 2014 to July 2015

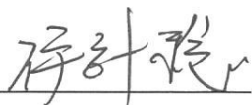
YCDC in Yangon, Myanmar

10 July 2015



Sakurai Noriko

JICA Myanmar Office



Ikei Minoru  
Chief Advisor



Akiba Junjiro  
Civil Advisor

**JICA assisted  
Capacity Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project  
implemented by YCDC**

10 March 2014  
TEC International  
Akiba Junjro  
Head of Project Management Office

**CONTENTS**

I Comment from the site visit on 7 March 2014  
II Site Photos  
III What is and Who does Project Management?  
for further discussion;  
IV Review YCDC Project Management

TEC International 2 09/03/2015

**I Comment from the site visit (1/3)  
on 7 March 2014**

- \* Drawings
  - General Arrangement or Flow Chart
  - Re-Bar Arrangement or Diagram
  - Details
- \* Specification
  - General, Particular and Technical Specification
  - or Materials and Workmanship
- \* Reinforcement Bar
  - High Yield Reinforcement Bar
  - Cover of Re-Bar and Concrete (Plastic) Spacer

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**I Comment from the site visit (2/3)  
on 7 March 2014**

- \* Concrete Structure
  - Vertical Construction Joint and Scabbling
  - Horizontal Construction Joint and Kicker
  - Expansion (Movement) Joint and Re-Bar detail
  - Joints and Water Bar
  - Waterproofing
  - Concreting sequence and Cold Joint
  - Panel size and Shrinkage Crack
  - Curing (Water and Curing Mat)

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**I Comment from the site visit (3/3)  
on 7 March 2014**

- \* Formworks
  - Plywood Shutter and Timber Support
  - Tie Rod (Bar) and Cone Spacer
  - Propping and Scaffolding
- \* Piling
  - Removal of Pile Head and Lean Mix Concrete
  - Bentonite and Slurry Water
  - Cleaning and Blinding Concrete
  - Temporary Access Road

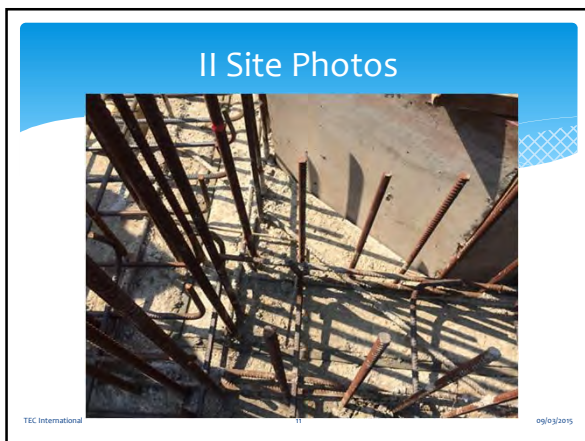
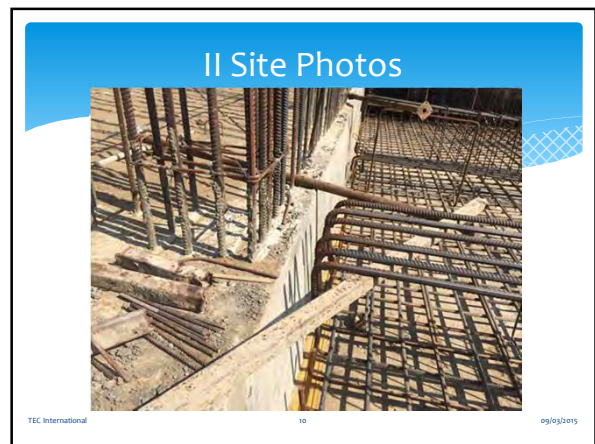
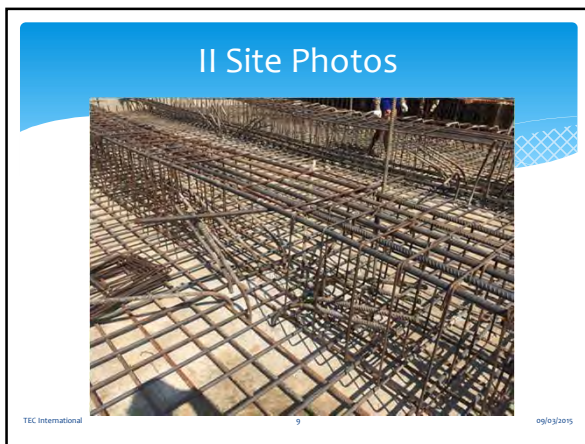
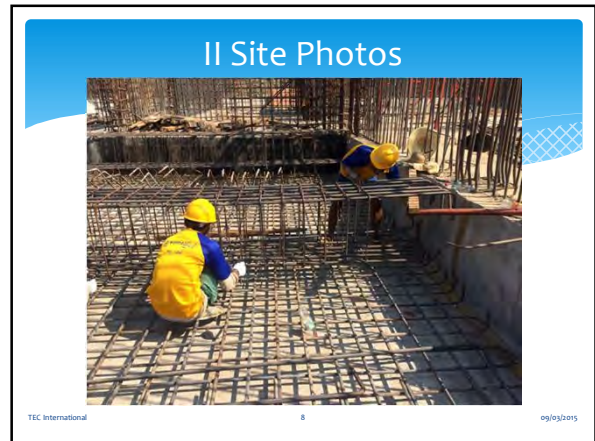
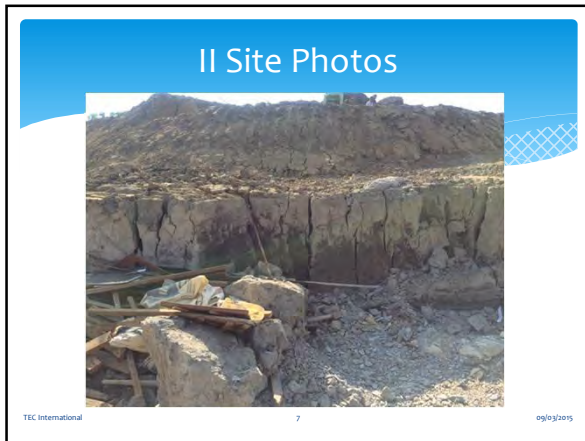
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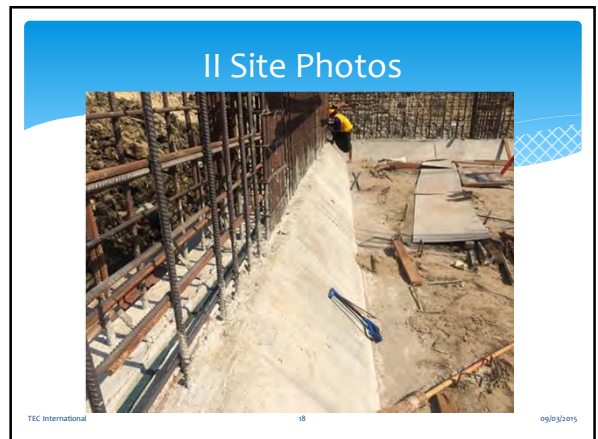
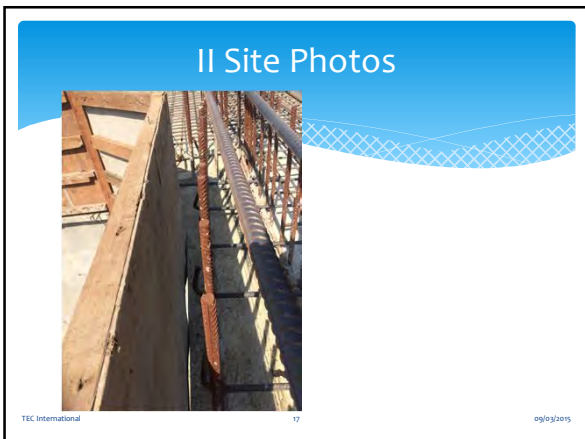
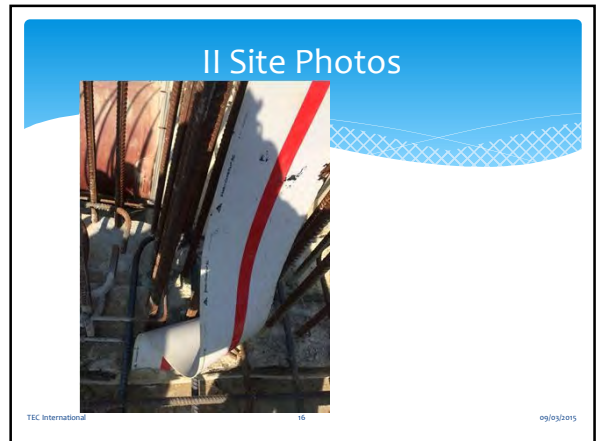
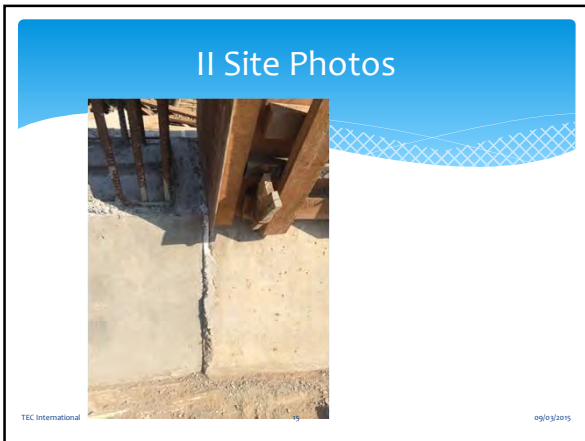
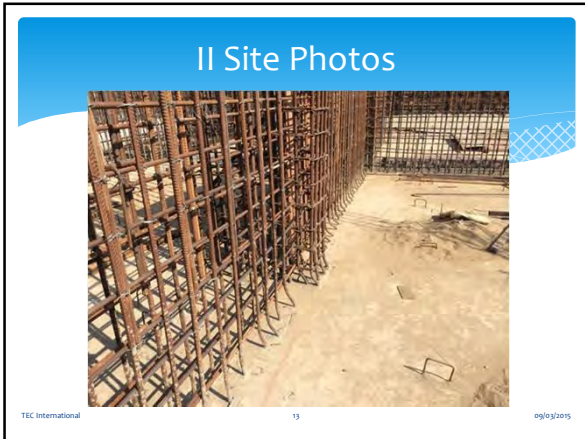
**II Site Photos**



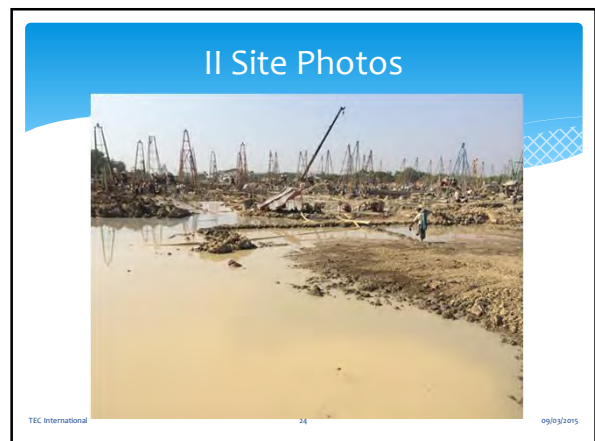
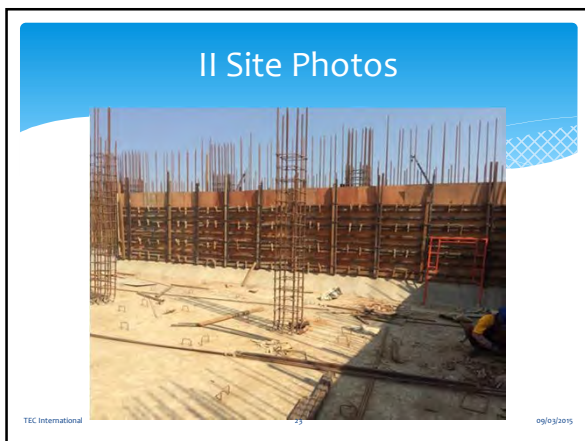
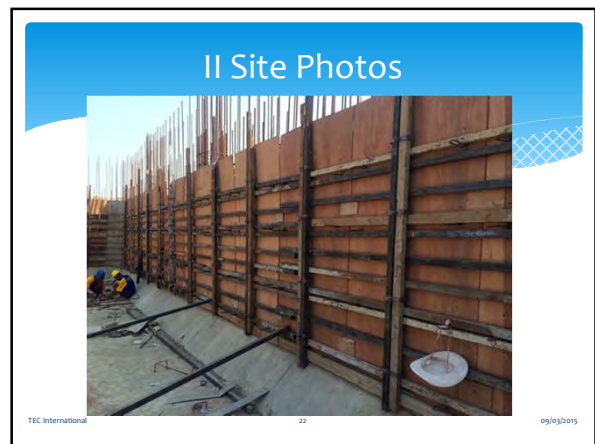
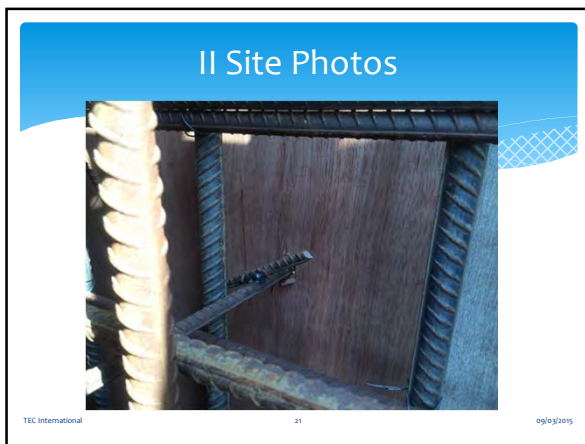
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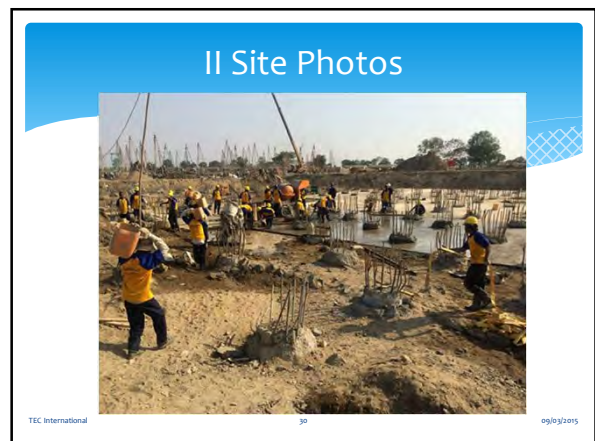
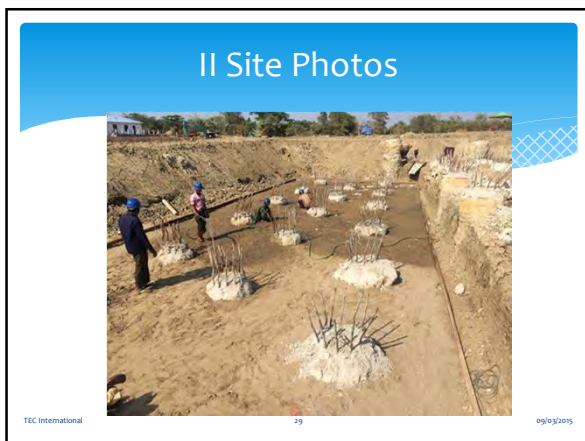
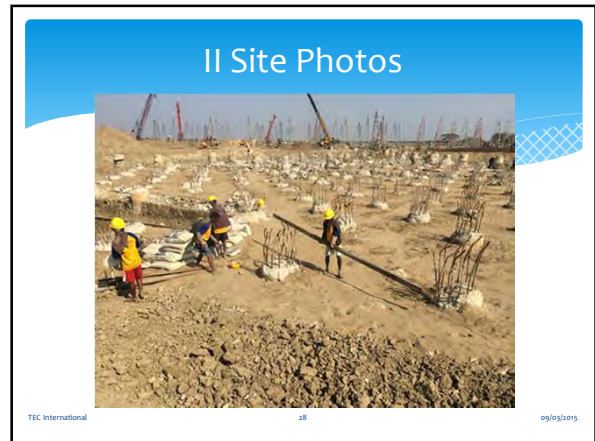
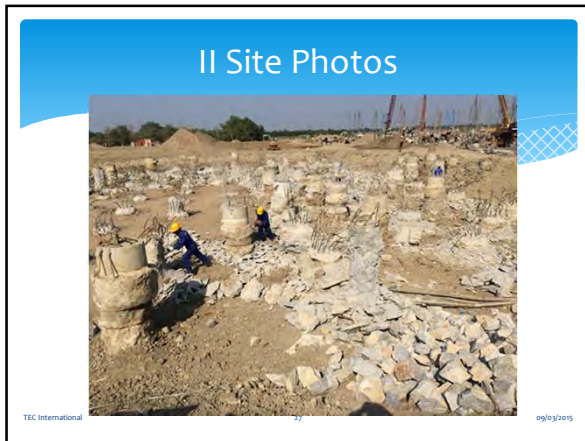
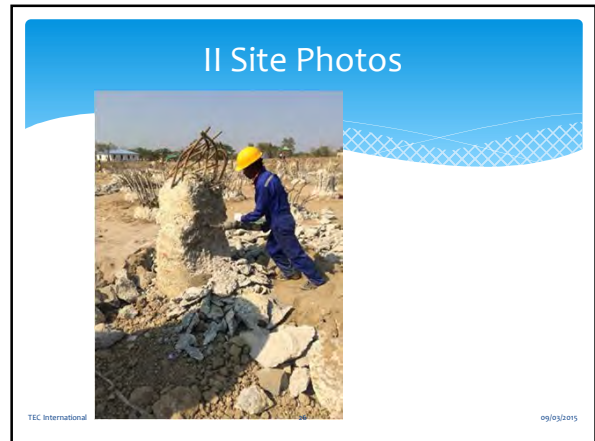
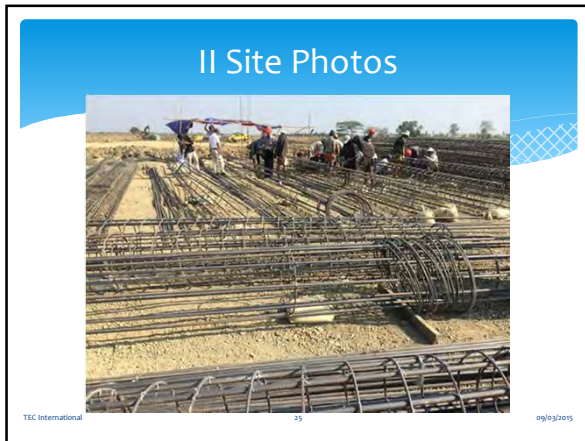


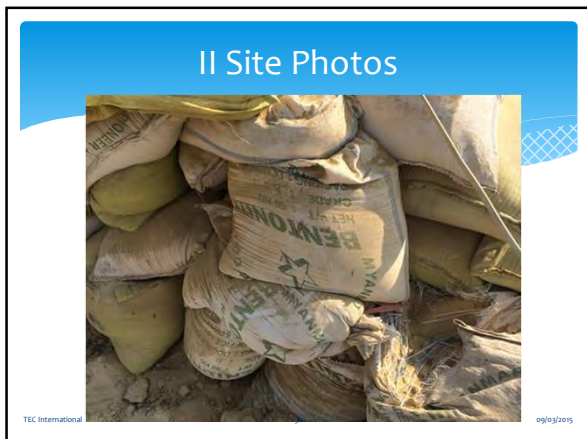












### III Project Management (1/4)

- \* **Technical**
  - Basic Design (Permanent Works and Construction Technique)
  - Detail Design (Structures, Plant and Temporary Works)
  - Programme (Overall and Detail)
  - Construction Method (Permanent and Temporary Works)
  - Construction Supervision (SQE, Production and Progress)
- \* **Support**
  - Procurement (Services and Materials)
  - Logistics
  - Safety, Quality Assurance and Environmental Protection

### III Project Management (2/4)

- \* **Commercial**
  - Financial (Payment and Cost Control)
  - Contractual (Variations and Claims)
- \* **Administration**
  - General Affairs
  - Finance and Accountant
  - Human Relations
  - Public Relations

### III Project Management (3/4)

- \* Project is alive.
  - = The Site is changing every day!
  - ➡ **Daily Site Meeting** is necessary on Site.
- \* Steady production is required.
  - = Progress review against Programme.
  - ➡ **Weekly Progress Meeting** to be held in the Project Office is useful to monitor site progress.

### III Project Management (4/4)

- \* Bad news as well as good news are awaited by the Senior Management of the Head Office.
  - = Report assist the decision of Top Management.
  - ➡ Project Manager submit **Monthly Report** for updating Senior Management.
- Then, The Senior Management review the Project with Project Manager by **Monthly Meeting**.

### IV Review YCDC Management (1/5) Planning and Procurement

- \* Design and Standard
- \* Specification
- \* Drawings
- \* Method Statement
- \* Overall Programme
- \* Procurement of Services, Materials and Plant
- \* Health and Hygiene (OHSAS)
- \* Quality Assurance (QA) and Document Control
- \* Environmental Management System (EMS)

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### IV Review YCDC Management (2/5) Site Management

- \* Safety
- \* Quality Control
- \* Environmental Protection
- \* Construction Method and Sequence
- \* Weekly Programme and Three Month Programme
- \* Daily, Weekly and Monthly Meetings
- \* Monthly Report

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### IV Review YCDC Management (3/5) Financial

- \* Bill of Quantities
- \* Payment Application
- \* Payment Assessment
- \* Cash Flow
- \* Budget
- \* Cost
- \* Final Forecast

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### IV Review YCDC Management (4/5) Organisation

Who does What?

- \* Stake Holders
- \* Staff Organisation Chart

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### IV Review YCDC Management (5/5) Mission and Policy

**YCDC and TECI work together for the Development on Lagunbyin Water Treatment Plant under Greater Yangon Water Supply Improvement Project**

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### Kyae Zu Par! and Arigato!

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**JICA assisted  
Capacity Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project  
implemented by YCDC**

Seminar No 2, 11 March 2014  
TEC International  
Project Management Office  
Akiba Junjiro

**CONTENTS**

- I Comment from the site visit on 11 March 2014
- II Site Photos
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for further discussion;
- IV Review YCDC Project Management


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**Comment from the site visit  
11 March 2014**

- \* Concreting Sequence and Cold Joint
- \* Concreting Method
  - Arrangement for Concrete Pump, Vibrators and Workers
  - Kickers
  - Expansion Joint
- \* Concreting Workmanship
  - Finish Levels and Finishing
- \* Concrete Materials
  - Temperature and Slump
- \* Re-Bar Arrangement
  - Spacing, Cover and Fixing Wire


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**II Site Photos**




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**II Site Photos**

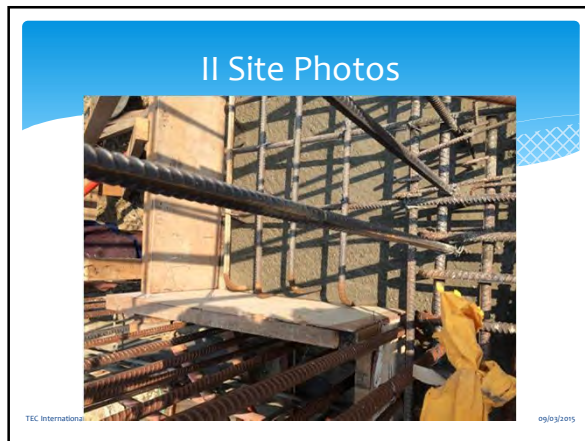
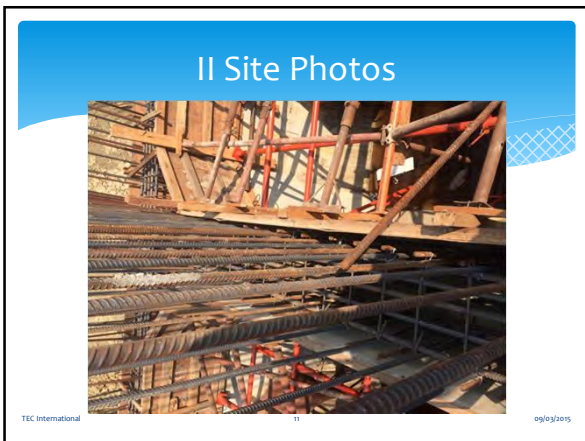
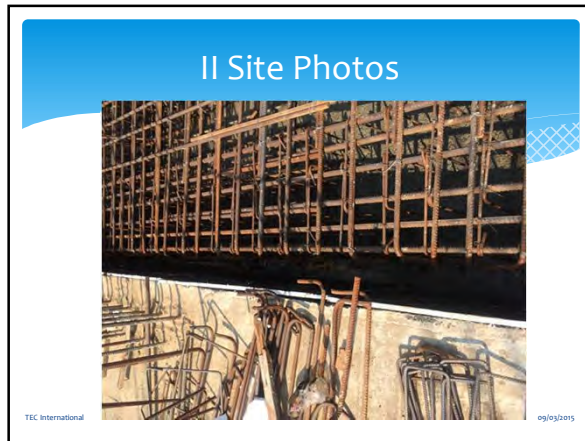
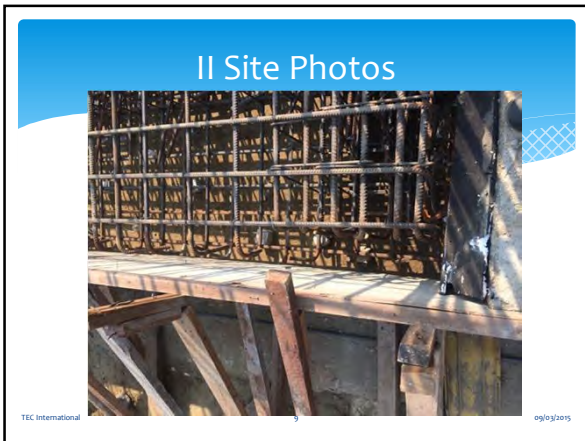
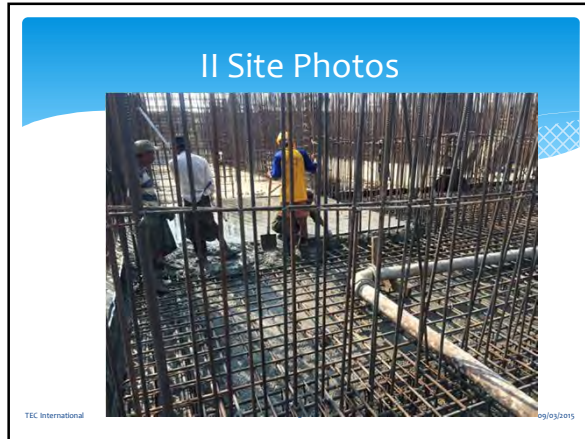
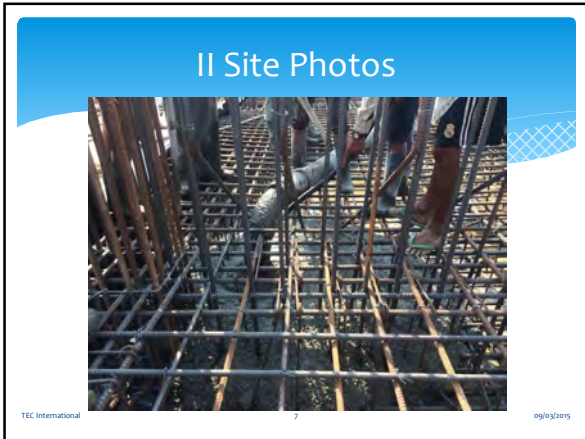


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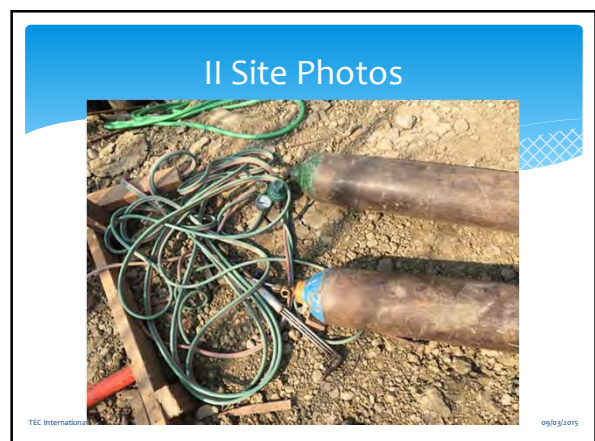
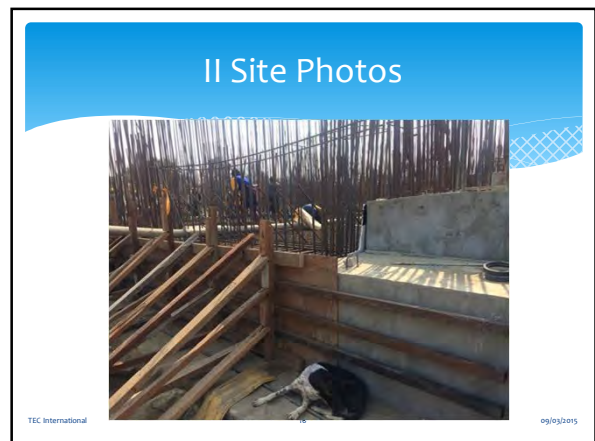
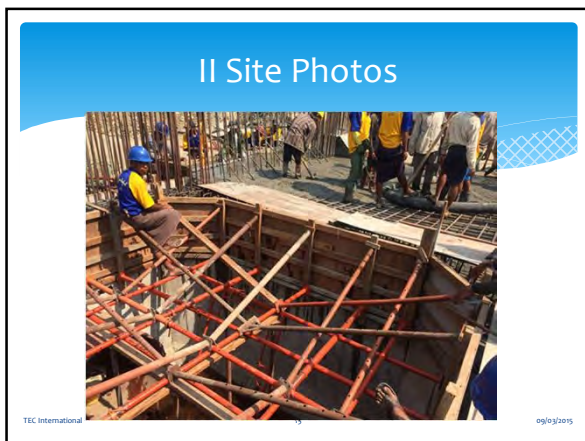
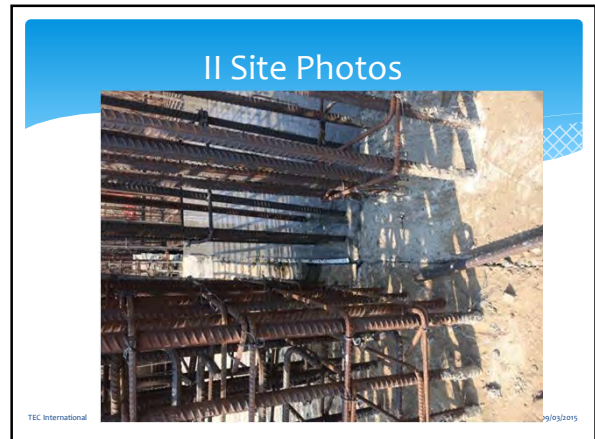
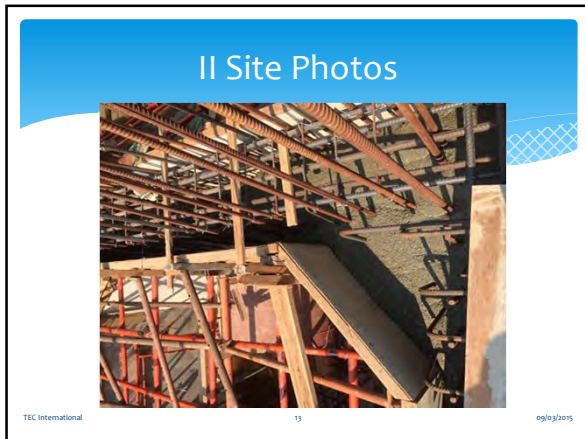
**II Site Photos**



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### III Project Management (1/4)

- \* **Technical**
  - Basic Design (Permanent Works and Construction Technique)
  - Detail Design (Structures, Plant and Temporary Works)
  - Programme (Overall and Detail)
  - Construction Method (Permanent and Temporary Works)
  - Construction Supervision (SQE, Production and Progress)
- \* **Support**
  - Procurement (Services and Materials)
  - Logistics
  - Safety, Quality Assurance and Environmental Protection

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### III Project Management (2/4)

- \* **Commercial**
  - Financial (Payment and Cost Control)
  - Contractual (Variations and Claims)
- \* **Administration**
  - General Affairs
  - Finance and Accountant
  - Human Relations
  - Public Relations

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### III Project Management (3/4)

- \* Project is alive.
  - = The Site is changing every day!
  - ➡ **Daily Site Meeting** is necessary on Site.
- \* Steady production is required.
  - = Progress review against Programme.
  - ➡ **Weekly Progress Meeting** to be held in the Project Office is useful to monitor site progress.

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### III Project Management (4/4)

- \* Bad news as well as good news are awaited by the Senior Management of the Head Office.
  - = Report assist the decision of Top Management.
  - ➡ Project Manager submit **Monthly Report** for updating Senior Management.
  - Then, The Senior Management review the Project with Project Manager by **Monthly Meeting**.

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### IV Review YCDC Management (1/5) Planning and Procurement

- \* Design and Standard
- \* Specification
- \* Drawings
- \* Method Statement
- \* **Overall Programme**
- \* Procurement of Services, Materials and Plant
- \* Health and Hygiene (OHSAS)
- \* Quality Assurance (QA) and Document Control
- \* Environmental Management System (EMS)

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### IV Review YCDC Management (2/5) Site Management

- \* Safety
- \* Quality Control
- \* Environmental Protection
- \* Construction Method and Sequence
- \* Weekly Programme and Three Month Programme
- \* Daily, Weekly and Monthly Meetings
- \* Monthly Report

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**IV Review YCDC Management (3/5)**  
**Financial**

- \* Bill of Quantities
- \* Payment Application
- \* Payment Assessment
- \* Cash Flow
- \* Budget
- \* Cost
- \* Final Forecast

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**IV Review YCDC Management (4/5)**  
**Organisation**

**Who does What?**

- \* Stake Holders
- \* Staff Organisation Chart

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**IV Review YCDC Management (5/5)**  
**Mission and Policy**

**YCDC and TECI work together for the Development on Lagunbyin Water Treatment Plant under Greater Yangon Water Supply Improvement Project**

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**Kyae Zu Par!  
and  
Arigato!**

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**JICA assisted  
Capacity Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project  
implemented by YCDC**

Seminar No 3, 13 March 2014  
TEC International  
Project Management Office  
Akiba Junjiro

**CONTENTS**

- I Comment from the site visit on 12 March 2014
- II Site Photos
- III Review YCDC Project Management


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**Comment from the site visit  
on 12 March 2014**

- \* **Concreting Workmanship**  
Curing and Finish Levels
- \* **Reinforced Concrete Structures**  
Construction Joints and Scabbling  
Kicker and Chamfer
- \* **Formworks**  
Form Tie and Support
- \* **Propping and Scaffolding**  
Walls and Roof Slab


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**II Site Photos**



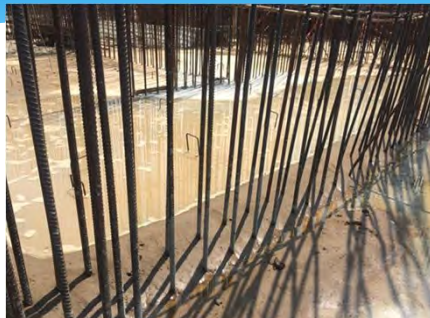
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**II Site Photos**



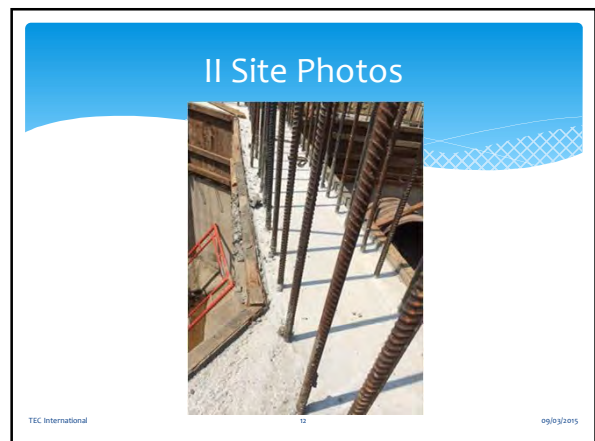
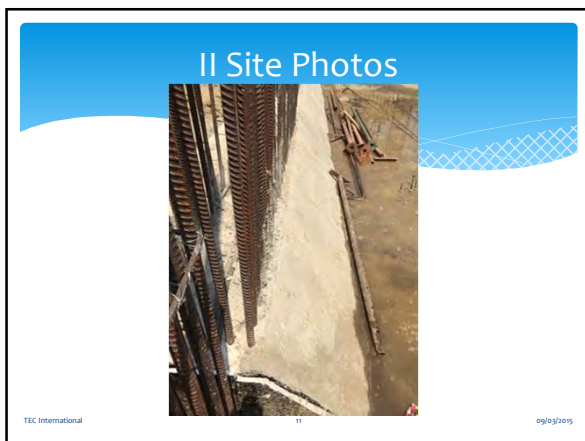
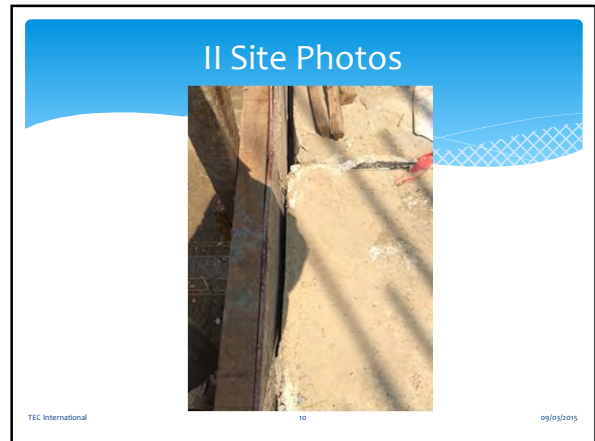
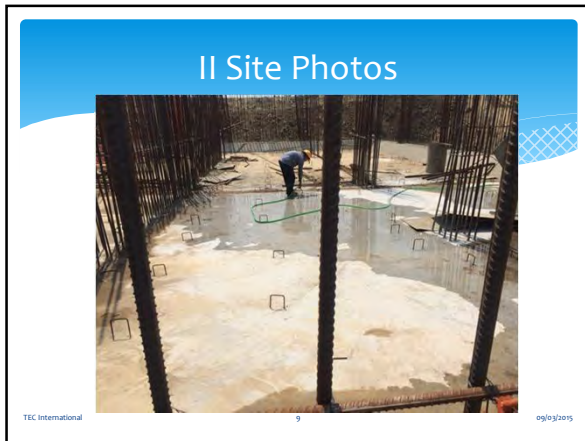
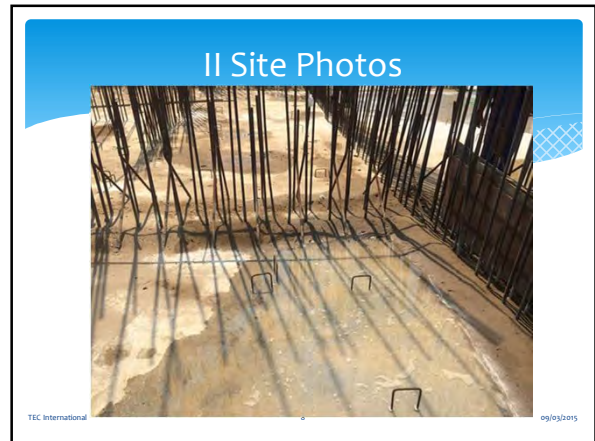
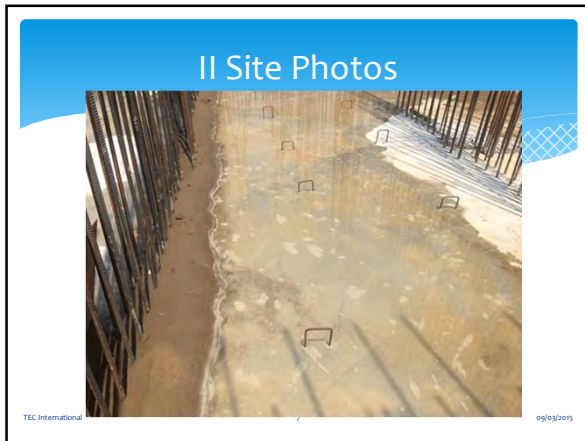
TEC International 5 09/03/2015

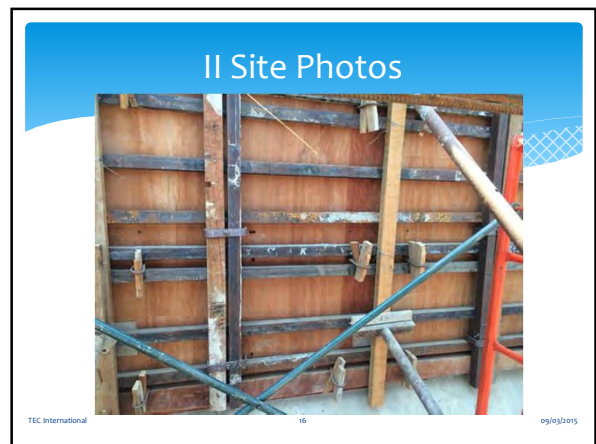
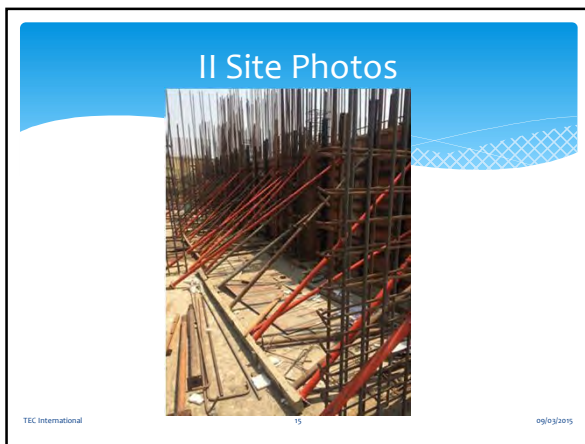
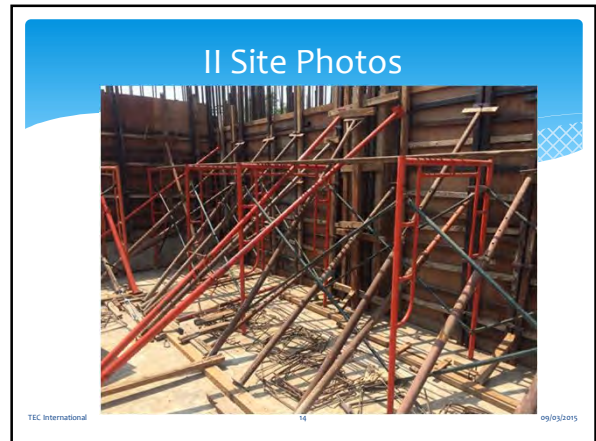
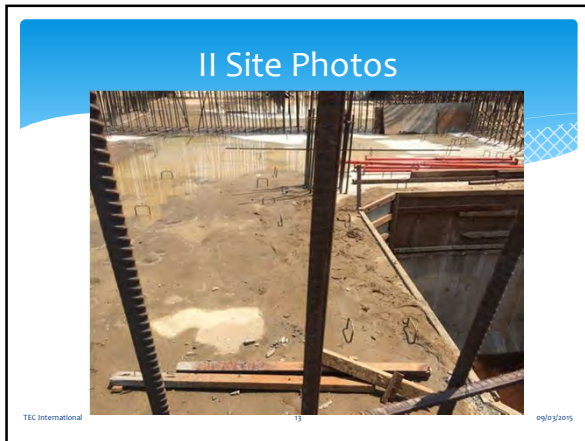
**II Site Photos**



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### IV Review YCDC Management (1/5) Planning and Procurement

- \* Design and Standard
- \* Specification
- \* Drawings
- \* Method Statement
- \* Overall Programme
- \* Procurement of Services, Materials and Plant
- \* Health and Hygiene (OHSAS)
- \* Quality Assurance (QA) and Document Control
- \* Environmental Management System (EMS)

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### IV Review YCDC Management (2/5) Site Management

- \* Safety
- \* Quality Control
- \* Environmental Protection
- \* Construction Method and Sequence
- \* Weekly Programme and Three Month Programme
- \* Daily, Weekly and Monthly Meetings
- \* Monthly Report

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### IV Review YCDC Management (3/5) Financial

- \* Bill of Quantities
- \* Payment Application
- \* Payment Assessment
- \* Cash Flow
- \* Budget
- \* Cost
- \* Final Forecast

TEC International 21 09/03/2015

### IV Review YCDC Management (4/5) Organisation

Who does What?

- \* Stake Holders
- \* Staff Organisation Chart

TEC International 22 09/03/2015

### IV Review YCDC Management (5/5) Mission and Policy

**YCDC and TECI work together for the Development on Lagunbyin Water Treatment Plant under Greater Yangon Water Supply Improvement Project**

TEC International 23 09/03/2015

**Kyae Zu Par!  
and  
Arigato!**

TEC International 24 09/03/2015

**JICA assisted  
Capacity Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project  
implemented by YCDC**

Seminar No 4, 14 March 2014  
TEC International  
Project Management Office  
Akiba Junjiro

**CONTENTS**

- I Comment from the site visit on 13 March 2014
- II Site Photos
- III Review YCDC Project Management


TEC International 2 09/03/2015

**Comment from the site visit  
on 13 March 2014**

- \* Temporary Access Road and its maintenance
- \* Bored Pile Technique and Workmanship
  - Excavation and Slurry Water
  - Mad or Bentonite (Density and Viscosity)
  - Cleaning of the Bottom of Piles and Desanding
  - Re-Bar Steel Cage
  - Tremie Concrete


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**II Site Photos**




TEC International 4 09/03/2015

**II Site Photos**



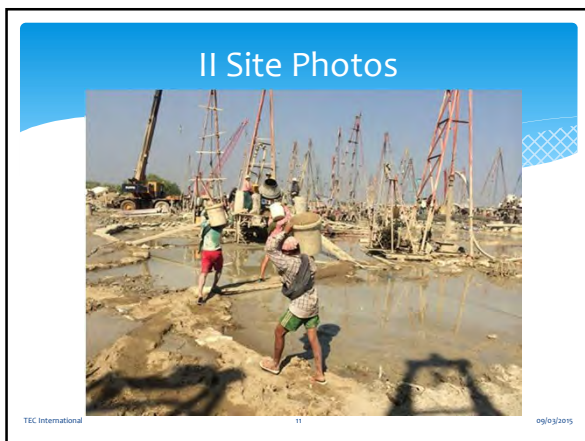
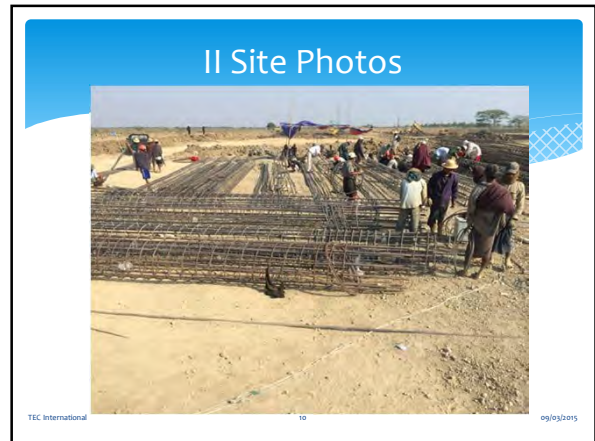
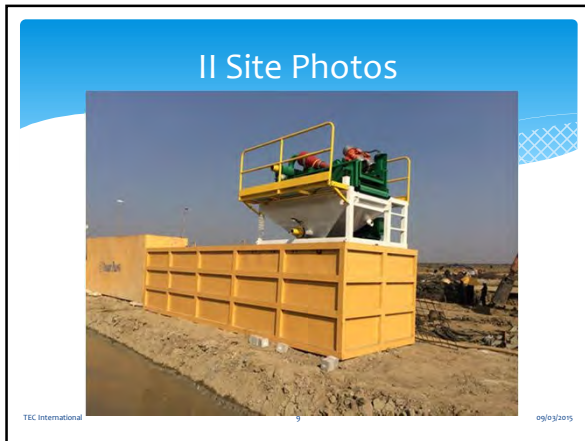
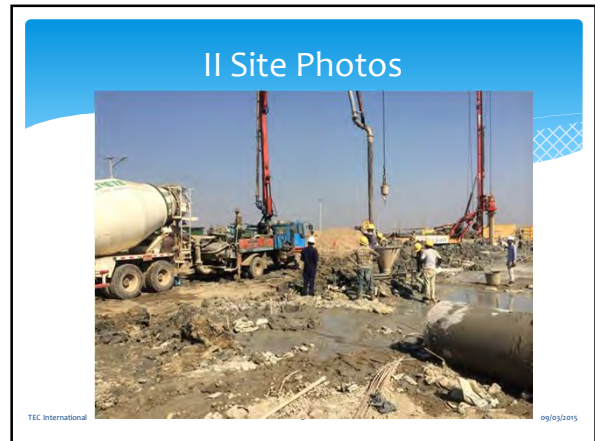
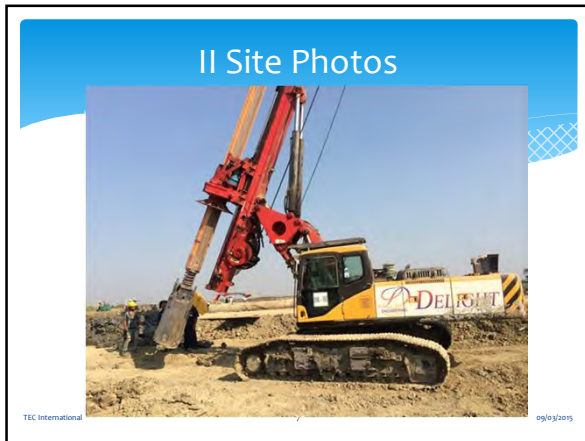
TEC International 5 09/03/2015

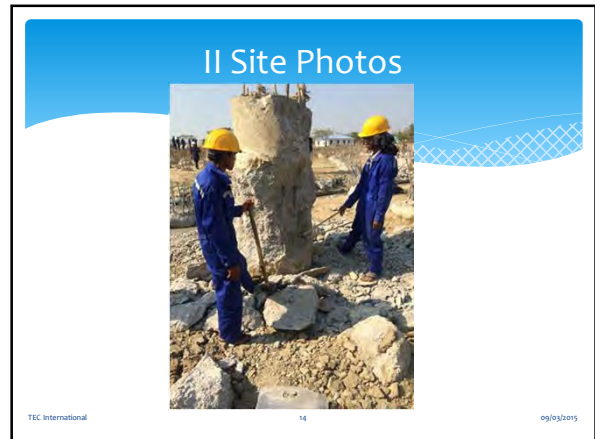
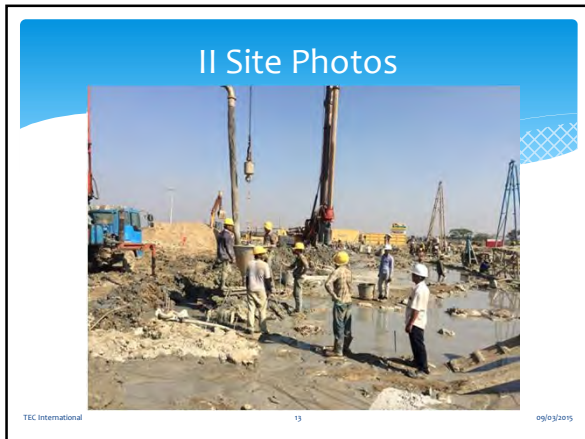
**II Site Photos**



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### IV Review YCDC Management (1/5) Planning and Procurement

- \* Design and Standard
- \* Specification
- \* Drawings
- \* Method Statement
- \* Overall Programme
- \* Procurement of Services, Materials and Plant
- \* Health and Hygiene (OHSAS)
- \* Quality Assurance (QA) and Document Control
- \* Environmental Management System (EMS)

TEC International 15 09/03/2015

### IV Review YCDC Management (2/5) Site Management

- \* Safety
- \* Quality Control
- \* Environmental Protection
- \* Construction Method and Sequence
- \* Weekly Programme and Three Month Programme
- \* Daily, Weekly and Monthly Meetings
- \* Monthly Report

TEC International 16 09/03/2015

### IV Review YCDC Management (3/5) Financial

- \* Bill of Quantities
- \* Payment Application
- \* Payment Assessment
- \* Cash Flow
- \* Budget
- \* Cost
- \* Final Forecast

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### IV Review YCDC Management (4/5) Organisation

Who does What?

- \* Stake Holders
- \* Staff Organisation Chart

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IV Review YCDC Management (5/5)  
Mission and Policy

**YCDC and TECI work together for  
the Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project**

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**Kyae Zu Par!  
and  
Arigato!**

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**JICA assisted  
Capacity Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project  
implemented by YCDC**

Seminar No 5, 18 March 2014  
TEC International  
Project Management Office  
Akiba Junjiro

**CONTENTS**

- I Review Site Management
  - 1 SQE
  - 2 Construction Details
  - 3 Meetings
- II Review YCDC Project Management

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**I Review Site Management (1/7)  
1-1 Safety**

**OHSAS 18000**  
(Occupational Health and Safety Assessment Series)

An occupational health and safety (OH & S) management system is able to eliminate or minimise risk to employees and other interested parties who may be exposed to OH & S risks associated its activities.

TEC International 3 09/03/2015

**I Review Site Management (2/7)  
1-2 Quality Assurance**

**ISO 9000**

Quality Assurance management system is enable for stakeholders to get consistent, good quality products and services which in turn brings many benefits to not only YCDC but also to Myanmar and its people.

TEC International 4 09/03/2015

**I Review Site Management (3/7)  
1-3 Environmental Protection**

**ISO 14000**

- \* Reduce cost of waste (rubbish, slurry and etc.) management
- \* Savings in consumption of energy (power, water and etc.) and materials
- \* Lower distribution costs
- \* Improve YCDC image among villagers, the public and other stakeholders

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**I Review Site Management (4/7)  
2 Construction Details**

**Please see Appendix!**

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### I Review Site Management (5/7) 3-1 Daily Meeting

- \* Where and When: Site Office, Afternoon
- \* Who : Subcontractors (Site Agent and/or Foreman)  
YCDC Site (Production) Engineer and/or Supervisor
- \* What : Discuss site activities carried out today  
Agree site activities for tomorrow  
Which activities?  
When do it?  
Why do it now?  
How to do it?

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### I Review Site Management (6/7) 3-2 Weekly Meeting

- \* Where and When: Project Office, Morning
- \* Who : Subcontractors (Boss and/or Site Agent)  
YCDC Section Manager and/or Site Engineer
- \* What : Review design issues  
Review progress and programme  
Construction Matters  
Problems and/or Bad Progress!!  
CHECK 1 Information, 2 Access, 3 Materials and Plant, 4 Workers  
still problems, then it should be a Financial Difficulty!

TEC International 8 09/03/2015

### I Review Site Management (7/7) 3-3 Monthly Meeting

- \* Where and When: Head Office, Morning
- \* Who : Head of Department and Deputy Head of Department  
Assistant Chief Engineer, Site Manager  
and Executive Engineer
- \* What : Review Progress and Programme  
Review SQE  
Financial issues  
Contractual issues  
Other Stakeholders

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### II Review YCDC Management (1/5) Planning and Procurement

- \* Design and Standard
- \* Specification
- \* Drawings
- \* Method Statement
- \* Overall Programme
- \* Procurement of Services, Materials and Plant
- \* Health and Hygiene (OHSAS)
- \* Quality Assurance (QA) and Document Control
- \* Environmental Management System (EMS)

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### II Review YCDC Management (2/5) Site Management

- \* Safety
- \* Quality Control
- \* Environmental Protection
- \* Construction Method and Sequence
- \* Weekly Programme and Three Month Programme
- \* Daily, Weekly and Monthly Meetings
- \* Monthly Report

TEC International 11 09/03/2015

### II Review YCDC Management (3/5) Financial

- \* Bill of Quantities
- \* Payment Application
- \* Payment Assessment
- \* Cash Flow
- \* Budget
- \* Cost
- \* Final Forecast

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**II Review YCDC Management (4/5)**  
**Organisation**

**Who's Who?**  
Stakeholders  
and  
**Who in charge of Which activity?**  
Site Staff Organisation Chart

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**II Review YCDC Management (5/5)**  
**Our Mission and Policy**

YCDC and TECI work together for the  
Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project

TEC International 14 09/03/2015

**Kyae Zu Par!**  
**and**  
**Arigatoh!**

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**JICA assisted  
Capacity Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project  
implemented by YCDC**

**Discussion No 6, 15 May 2014  
JICA Advisors  
for Monitoring of LWTP Construction**

**CONTENTS (1/2)**

- I Review of the Project Management
  - 1 Standard and Specifications
  - 2 Drawings and Method of Construction
  - 3 Programmes
  - 4 BOQ and Price Schedule
  - 5 Procurement and Budget Control
  - 6 Organisation of the Team

**CONTENTS (2/2)**

- II Review of the Site Management
  - 1 Health, Hygiene and Safety (OHSAS)
  - 2 Quality Assurance (QA), Quality Control and Document Control
  - 3 Environmental Management System (EMS)
  - 4 Daily Site and Weekly Progress Meetings Materials, Labour, Equipment and Subcontractors

**I Review the Project Management (1/6)**

- 1 Standard and Specifications
  - 1 Which standard do you use when you design the works?
  - 2 Do you have specifications for the Lagunbyin project?
  - 3 Do you have the tender document for the Lagunbyin project?

**I Review the Project Management (2/6)**

- 2 Drawings and Method of Construction
  - 1 Do you have a study on the method and sequence of the works?
  - 2 How do you select the construction method?

**I Review Project Management (3/6)**

- 3 Programmes
  - 1 Do you have an over all Programme?
  - 2 How do you monitor the works against your plan?



I Review Project Management (4/6)  
4 BOQ and Price Schedule

- 1 Do you have a measurement or a lump sum contract?
- 2 Do you have a standard Method of Measurement?
- 3 Do you have a price escalation or a fixed contract?

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I Review Project Management (5/6)  
5 Procurement and Budget Control

- 1 Do you have any procedures for procurement of services, materials and plant?
- 2 How do you control the budget?

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I Review Project Management (6/6)  
6 Organisation of the Team

- 1 How do you make a decision on issues (problems) raising up during the course of the Works?

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II Review Site Management (1/6)  
1 Safety (Repeated)

OHSAS 18000  
(Occupational Health and Safety Assessment Series)

An occupational health and safety (OH & S) management system is able to eliminate or minimise risks to employees and other interested parties who may be exposed to OH & S risks associated their activities.

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II Review Site Management (2/6)  
2 Quality Assurance (Repeated)

ISO 9000

Quality Assurance management system is enable for stakeholders to get consistent, good quality products and services which in turn brings many benefits to not only YCDC but also to Myanmar and its people.

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II Review Site Management (3/6)  
3 Environmental Protection (Repeated)

ISO 14000

- \* Reduce cost of waste (rubbish, slurry and etc.) management
- \* Savings in consumption of energy (power, water and etc.) and materials
- \* Lower distribution costs
- \* Improve YCDC image among villagers, the public and other stakeholders

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**II Review Site Management (4/6)**  
4-1 Progress Meetings

How do you arrange Materials?  
How do you arrange Labour?  
How do you arrange Equipment?  
How do you manage Subcontractors?

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**II Review Site Management (5/6)**  
4-2 Progress Meetings

How do you control quality of the works?  
How do you control progress of the works?  
How do you control the budget?  
How do you purchase what you need?  
How do you record the activities on Site?

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**II Review Site Management (6/6)**  
5 Site Organisation

Who does what?  
Authority and Responsibility  
of the Site Office

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**Our Mission and Policy  
to the Lagunbyin Project**

YCDC and TECI work together for the  
betterment of  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project

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**Kyae Zu Par!  
and  
Arigatoh!**

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**JICA assisted  
Capacity Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project  
implemented by YCDC**

**Discussion No 7, 10 July 2014  
JICA Advisors  
for Monitoring of LWTP Construction**

**CONTENTS**

- I The example of WTP
  - 1 Intake P/S
  - 2 Sedimentation Basin
  - 3 Rapid Sand Filter
  - 4 Others

TEC International 2 09/03/2015

**1 Intake P/S**

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**2 Sedimentation Basin**

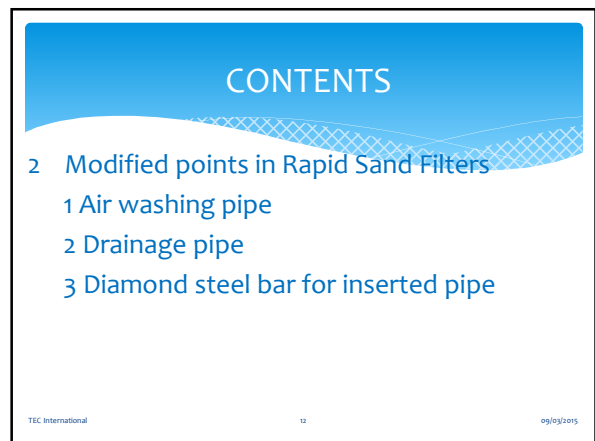
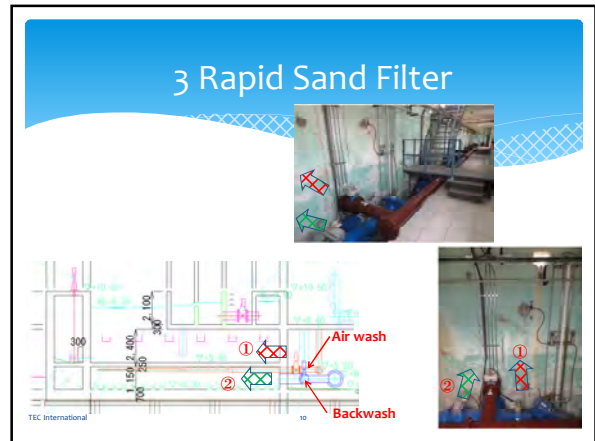
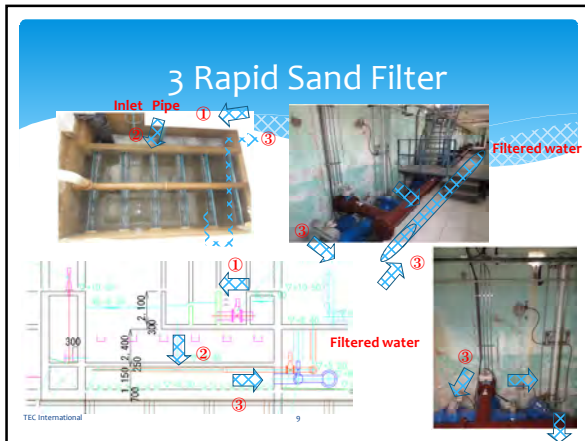
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**3 Rapid Sand Filter**

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**3 Rapid Sand Filter**

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### 1 Air washing

If pipes are not inserted in the same elevation, water levels differ for each filter.

Motor-operated Valve

Series 1

Series 2

TEC Internat

14

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### 2 Drainage pipe

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14

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### 3 Diamond steel bar for Open area

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### Kyae Zu Par! and Arigatoh!

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Capacity Development on  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project  
implemented by YCDC**

**Discussion No 7, 27 May 2014  
JICA Advisors  
for Monitoring of LWTP Construction**

**CONTENTS (1/2)**

- I Review of the Project Management
  - 1 Standard and Specifications
  - 2 Drawings and Method of Construction
  - 3 Programmes
  - 4 BOQ and Price Schedule
  - 5 Procurement and Budget Control
  - 6 Organisation of the Team

**CONTENTS (2/2)**

- II Review of the Site Management
  - 1 Health, Hygiene and Safety (OHSAS)
  - 2 Quality Assurance (QA), Quality Control and Document Control
  - 3 Environmental Management System (EMS)
  - 4 Daily Site and Weekly Progress Meetings Materials, Labour, Equipment and Subcontractors

**I Review the Project Management (1/6)**  
**1 Standard and Specifications**

- 1 Which standard do you use when you design the works?
- 2 Do you have specifications for the Lagunbyin project?
- 3 Do you have the tender document for the Lagunbyin project?

**I Review the Project Management (2/6)**  
**2 Drawings and Method of Construction**

- 1 Do you have a study on the method and sequence of the works?
- 2 How do you select the construction method?

**I Review Project Management (3/6)**  
**3 Programmes**

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- 2 How do you monitor the works against your plan?

**I Review Project Management (4/6)**  
**4 BOQ and Price Schedule**

- 1 Do you have a measurement or a lump sum contract?
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**I Review Project Management (5/6)**  
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- 1 Do you have any procedures for procurement of services, materials and plant?
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**6 Organisation of the Team**

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**II Review Site Management (3/6)**  
**3 Environmental Protection (Repeated)**

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**II Review Site Management (4/6)**  
**4-1 Progress Meetings**

How do you arrange Materials?  
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How do you arrange Equipment?  
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TEC International 13 09/03/2015

**II Review Site Management (5/6)**  
**4-2 Progress Meetings**

How do you control quality of the works?  
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How do you control the budget?  
How do you purchase what you need?  
How do you record the activities on Site?

TEC International 14 09/03/2015

**II Review Site Management (6/6)**  
**5 Site Organisation**

Who does what?  
Authority and Responsibility  
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TEC International 15 09/03/2015

**Our Mission and Policy  
to the Lagunbyin Project**

YCDC and TECI work together for the  
betterment of  
Lagunbyin Water Treatment Plant  
under Greater Yangon  
Water Supply Improvement Project

TEC International 16 09/03/2015

**Kyae Zu Par!  
and  
Arigatoh!**

TEC International 17 09/03/2015

JICA assisted Capacity Development on  
Lagunbyin Water Treatment Plant under  
Greater Yangon Water Supply Improvement Project  
implemented by YCDC

**FIDIC CONDITIONS OF CONTRACT**  
Multilateral Development Bank  
Harmonised Edition

Seminar No 8, 17 September 2014  
JICA Advisors for Monitoring of LWTP Construction

### Tender Documents (JICA)

- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA Loans (October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements  
Specifications  
Drawings  
Bills of Quantities  
Other Information
- \* **Part 3 Conditions of Contract and Contract Forms**

JICA Advisor (TEC) 2 09/03/2015

### CONTENTS

1. What's FIDIC
2. What's MDB Version
3. Details of General Clauses
4. Particular Conditions
5. Sample Forms
6. Important Points (EOT and VO)
7. Question and Answer

JICA Advisor (TEC) 3 09/03/2015

### What's FIDIC ? (1/2)

Fédération Internationale Des Ingénieurs-Conseils  
= International Federation of Consulting Engineer

FIDIC is an international standards organisation for the construction industry.

FIDIC was founded by Belgium, French and Switzerland in 1915 and 86 participants in 2010.

FIDIC provides family of contract templates, so called rainbow books of FIDIC General Conditions.

JICA Advisor (TEC) 4 09/03/2015

### GCC issued by FIDIC (2/2)

Red Book - Construction  
Yellow Book - Plant & Design Build  
Silver Book - EPC/Turnkey

(Gold, White, Green, Blue and Pink books)

JICA Advisor (TEC) 5 09/03/2015

### Multilateral Development Bank (MDB) Harmonised Edition (1/5)

- \* MDB Harmonised Edition 2006 is edited for development banks basing on the red book 1999 version and revised in 2010.

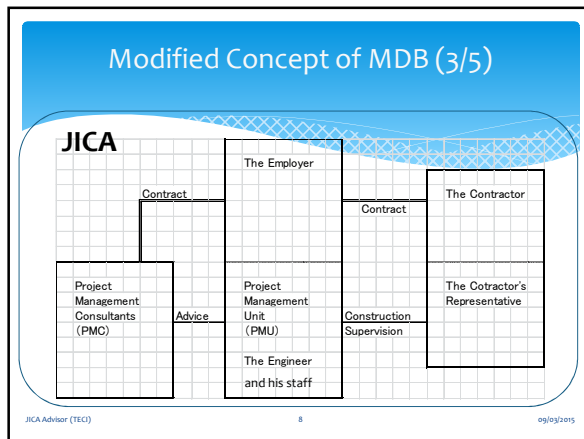
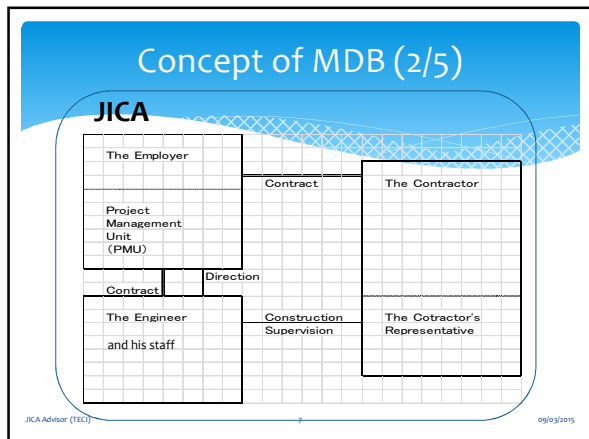
Particular Sub-Clauses added are:-

- \* Sub-Clause 1.15 Inspections and Audit by the Bank.
- \* Sub-Clauses for Drugs, Arms, Religious Customs, Funerals, Forced Labour, Child Labour, Worker' Organisation, Non-Discrimination and Equal Opportunity.

**Pink Book – Designed by the Employer**

JICA Advisor (TEC) 6 09/03/2015





- ### Priority of Documents (4/5)
- GCC Sub-Clause 1.5
- \* the Contract Agreement (if any),
  - \* the Letter of Acceptance,
  - \* the Letter of Tender,
  - \* the Particular Conditions – Part A,
  - \* the Particular Conditions – Part B, } **MDB Version**
  - \* these General Conditions,
  - \* the Specification,
  - \* the Drawings, and
  - \* the Schedules and any other documents forming part of the Contract.
- Small text at the bottom left: JICA Advisor (TEC) 9 09/03/2015

- ### STRUCTURE OF GC (5/5)
- \* GC: General Conditions
    - Text
    - Appendix: General Conditions of Dispute Board Agreement
    - Annex: Procedural Rules
  - \* PC: Particular Conditions
    - Part A: Contract Data
    - Part B: Specific Provisions
  - \* Sample Forms
    - Annexes: Forms of Securities
    - Letter of Tender etc.
- Small text at the bottom left: JICA Advisor (TEC) 10 09/03/2015

- ### DETAILS OF GENERAL CONDITIONS (1/20)
- Sheet 1 of 2
- #### Clause 1 General Provisions
- \* 1.1 Definitions
    - 1.1.1.6 "Drawings" means ••• issued by (or on behalf of) the Employer •••)
    - 1.1.4.3 "Cost" means all expenditure reasonably incurred by the Contractor, whether on or off the Site, including overhead and similar charges, but not include profit.
    - 1.1.4.10 "Provisional Sum" means ••• for the execution of any part of the Works••• under Sub-Clause 13.5•••
    - 1.1.6.8 "Unforeseeable" means not reasonably foreseeable by an experienced contractor by the Base Date.
- Small text at the bottom left: JICA Advisor (TEC) 11 09/03/2015

- ### DETAILS OF GENERAL CONDITIONS (1/20)
- Sheet 2 of 2
- #### Clause 1 General Provisions
- \* 1.2 Interpretation
  - \* 1.3 Communications
  - \* 1.4 law and language
  - \* 1.5 Priority of Documents
  - \* 1.6 Contract Agreement
  - \* 1.8 Care and Supply Documents
  - \* 1.13 Compliance with Laws
  - \* 1.14 Joint and Several Liability
  - \* 1.15 Inspections and Audit by the Bank
- Small text at the bottom left: JICA Advisor (TEC) 12 09/03/2015

## DETAILS OF GENERAL CONDITIONS (2/20)

### Clause 2 The Employer

- \* 2.1 **Right of Access to the Site**
- \* 2.2 Permits, Licenses or Approval  
The Employer shall provide •••reasonable assistance •••  
(b) (ii) for the delivery of Goods, including clearance through customs,•••
- \* 2.3 Employer's Personnel
- \* 2.5 Employer's Claim

JICA Advisor (TEC)

13

09/03/2015

## DETAILS OF GENERAL CONDITIONS (3/20)

### Clause 3 The Engineer

- \* 3.1 Engineer's Duty and Authority  
**The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract.**  
the Engineer shall have no authority to amend the Contract.  
(a) •••**the Engineer shall be deemed to act for the Employer.**
- \* 3.2 Delegation by the Engineer
- \* 3.5 Determinations  
••• **the Engineer shall make a fair determination**  
in accordance with the Contract•••

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14

09/03/2015

## DETAILS OF GENERAL CONDITIONS (4/20)

### Clause 4 The Contractor

- \* 4.1 Contractor's General Obligations  
**The Contractor shall design •••, execute and complete the Works in accordance with the Contract •••**
- \* 4.3 Contractor's Representative
- \* 4.4 Subcontractors
- \* 4.9 Quality Assurance
- \* 4.18 Protection of the Environment
- \* 4.21 Progress Report
- \* 4.22 Security of the Site

JICA Advisor (TEC)

15

09/03/2015

## DETAILS OF GENERAL CONDITIONS (5/20)

### Clause 5 Nominated Subcontractors

- \* 5.1 Definition of "Nominated Subcontractor"
- \* 5.2 Objection to Nomination  
The Contractor could object NSC with reasonable reasons.
- \* 5.3 Payments to Nominated Subcontractors
- \* 5.4 Evidence of Payments
- \* 4.4 The Contractor shall be responsible for the acts or defaults of **any** subcontractors •••

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16

09/03/2015

## DETAILS OF GENERAL CONDITIONS (6/20)

### Clause 6 Staff and Labour

- \* This Clause specified Wages, Working Hours, Conditions, Facilities, Health, Safety, Personal Records, Foreign Personnel, Foodstuffs, Supply Water and Insect and Pest Nuisance.
- \* Also specified , Alcohol, Drugs, Arms, Festivals, Religious Customs, Funerals, Forced Labour, Child Labour, Worker's Organisation, Non-Discrimination and Equal Opportunity.

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17

09/03/2015

## DETAILS OF GENERAL CONDITIONS (7/20)

### Clause 7 Plants, Materials and Workmanship

- \* 7.1 Manner of Execution
- \* 7.2 Samples
- \* 7.3 Inspection
- \* 7.4 Testing
- \* 7.5 Rejection
- \* 7.6 Remedial Work
- \* 7.7 Ownership of Plant and Materials
- \* 7.8 Royalties

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18

09/03/2015

**DETAILS OF GENERAL CONDITIONS (8/20)**

**Clause 8 Commencement, Delays and Suspension**

- \* 8.1 Commencement of Works
- \* 8.2 Time for Completion
- \* 8.3 Programme
- \* **8.4 Extension of Time for Completion (a) to (e) 5 reasons for EOT**
- \* 8.5 Delay Caused by Authorities
- \* 8.6 Rate of Progress
- \* 8.7 Delay Damages
- \* 8.8 Suspension of Work

JICA Advisor (TEC) 19 09/03/2015

**DETAILS OF GENERAL CONDITIONS (9/20)**

**Clause 9 Tests on Completion**

- \* 9.1 Contractor's Obligation
- \* 9.2 Delayed Tests
- \* 9.3 Retesting
- \* 9.4 Failure to Pass Tests on Completion

JICA Advisor (TEC) 20 09/03/2015

**DETAILS OF GENERAL CONDITIONS (10/20)**

**Clause 10 Employer's Taking Over**

- \* 10.1 Taking Over of the Works and Sections  
 Confirm the Site conditions to prepare a snag list for outstanding works.  
 Confirm documents, such as as-built drawings, O & M Manuals, Guarantees etc.  
 Then,  
**Issue the Taking-Over Certificate.**  
 Final Payment  
 Release Retention Money

JICA Advisor (TEC) 21 09/03/2015

**DETAILS OF GENERAL CONDITIONS (11/20)**

**Clause 11 Defects Liability**

- \* 11.1 Completion of Outstanding Work and Remedying Defects
- \* 11.2 Cost of Remedying Defects
- \* 11.3 Extension of Defects Notification Period
- \* 11.4 Failure to Remedy Defects
- \* 11.5 Removal of Defective Work
- \* 11.9 Performance Certificate
- \* 11.10 Unfulfilled Obligations
- \* 11.11 Clearance of Site

JICA Advisor (TEC) 22 09/03/2015

**DETAILS OF GENERAL CONDITIONS (12/20)**

**Clause 12 Measurement and Evaluation**

- \* **12.1 Works to be Measured**
- \* **12.2 Method of Measurement**
- \* 12.3 Evaluation
- \* 12.4 Omissions

JICA Advisor (TEC) 23 09/03/2015

**DETAILS OF GENERAL CONDITIONS (13/20)**

**Clause 13 Variations and Adjustments**

- \* 13.1 Right to Vary
- \* 13.2 Value Engineering  
 Saving will be shared by the Employer and the Contractor
- \* 13.3 **Variation Procedure**
- \* 13.5 **Provisional Sums**
- \* 13.6 Daywork
- \* 13.7 Adjustments for Changes in Legislation
- \* 13.8 Adjustments for Changes in Cost

JICA Advisor (TEC) 24 09/03/2015

DETAILS OF GENERAL CONDITIONS (14/20)

Clause 14 Contract Price and Payment

- \* 14.1 The Contract Price
- \* 14.2 Advance Payment
- \* 14.3 Application for Interim Payment Certificates
- \* 14.6 Issue of Interim Payment Certificates
- \* 14.7 **Payment**
- \* 14.8 Delayed Payment
- \* 14.9 Payment of Retention Money
- \* 14.10 Statement of Completion
- \* 14.13 Issue of Final Payment Certificate

JICA Advisor (TEC) 25 09/03/2015

DETAILS OF GENERAL CONDITIONS (15/20)

Clause 15 Termination by Employer

- \* 15.1 Notice to Correct
- \* 15.2 Termination by Employer
- \* 15.3 Valuation at Date of Termination
- \* 15.4 Payment after Termination
- \* 15.6 Corrupt or Fraudulent Practices

JICA Advisor (TEC) 26 09/03/2015

DETAILS OF GENERAL CONDITIONS (16/20)

Clause 16 Suspension and Termination by Contractor

- \* 16.1 Contractor's Entitlement to Suspend Work
- \* 16.2 Termination by Contractor

JICA Advisor (TEC) 27 09/03/2015

DETAILS OF GENERAL CONDITIONS (17/20)

Clause 17 Risk and Responsibility

- \* 17.1 Indemnities
- \* 17.2 Contractor's Care of the Works
- \* 17.3 Employer's Risks
- \* 17.5 Intellectual and Industrial Property Rights
- \* 17.7 Use of Employer's Accommodation/Facilities

JICA Advisor (TEC) 28 09/03/2015

DETAILS OF GENERAL CONDITIONS (18/20)

Clause 18 Insurance

- \* 18.1 General Requirements for Insurances
  - Contractor's All Risks (CAR)
  - Third Party's Loss (TPL, TPI)
  - Employer's (Worker's) Compensation Insurance (ECI, WCI)
  - Professional Indemnity (Liability) Insurance (PII, PLI)
  - Marine Cargo
  - Plant
  - Vehicles
  - etc.

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DETAILS OF GENERAL CONDITIONS (19/20)

Clause 19 Force Majeure

- \* 19.1 Definition of Force Majeure
  - Beyond a Party's Control
  - e.g. war, terrorism, riot, earthquake, cyclone etc.

JICA Advisor (TEC) 30 09/03/2015

## DETAILS OF GENERAL CONDITIONS (20/20)

Clause 20 Claims, Disputes and Arbitration

- \* 20.1 Contractor's Claims
- \* 20.2 Appointment of the Dispute Board
- \* 20.4 Obtaining Board's Decision
- \* 20.5 Amicable Settlement
- \* 20.6 Arbitration

JICA Advisor (TEC) 31 09/03/2015

## Particular Conditions Part A

- \* Contract Data
  - Name of the Contract
  - Loan Agreement Number
  - The Employer
  - The Engineer
  - The Bank
  - The Borrower
  - Completion Date
  - Defect Notification Period
  - etc.

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## Particular Conditions Part B

- \* Specific Provisions are intended to address country, project, and contract specific requirements not covered by General Conditions.
- \* Very careful consideration and/or legal advice is recommended when amending provisions or drafting new clauses.

JICA Advisor (TEC) 33 09/03/2015

## JICA Sample Forms

- \* A: Letter of Tender
- \* B: Letter of Acceptance
- \* C: Contract Agreement
- \* D: Dispute Board Agreement (For a one-person DB)
- \* E: Dispute Board Agreement (For a three-persons DB)
- \* F: Performance Security (Demand Guarantee, Bond)
- \* G: Advance Payment Security (Bond)
- \* H: Retention Money Security (Bond)
- \* I: Parent Company Guarantee
- \* J: Tender Security (Bond)

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## Extension of Time (EOT) and Variation Order (VO) (1/2)

- \* SC 1.9 Delayed Drawings or Instructions
- \* SC 2.1 Right of Access to the Site
- \* SC 4.7 Setting Out
- \* SC 4.12 Unforeseeable Physical Conditions
- \* SC 4.24 Fossils
- \* SC 7.4 Testing
- \* SC 8.4 Extension of Time for Completion (5 causes)
- \* SC 8.5 Delays Caused by Authorities
- \* SC 8.9 Consequences of Suspension

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## Extension of Time (EOT) and Variation Order (VO) (2/2)

- \* SC 10.2 Taking Over of Parts of the Works
- \* SC 10.3 Interference with Tests on Completion
- \* SC 11.8 Contractor to Search
- \* SC 12.4 Omissions
- \* SC 13.7 Adjustments for Changings in Legislation
- \* SC 16.1 Contractor's Entitlement to Suspend Work
- \* SC 17.4 Consequences of Employer's Risks
- \* SC 19.4 Consequences of Force Majeure

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The Employer and The Contractor  
and The Engineer  
(Consultant)  
and JICA  
and Subcontractors  
and all stakeholders




**Work Together  
For the Successful Completion !**

JICA Advisor (TEC) 37 09/09/2015

Question and Answer

**Ever Forward**



**We are Civil Engineers !**

JICA Advisor (TEC) 38 09/09/2015

**Kyae Zue Thin Bar Taē**



JICA Advisor (TEC) 39 09/09/2015

JICA assisted Capacity Development on  
Lagunbyin Water Treatment Plant under  
Greater Yangon Water Supply Improvement Project  
implemented by YCDC

Specifications for Civil Projects  
including M and E Works under  
International Tender

Seminar No 9, 10 October 2014  
JICA Advisors for Monitoring of LWTP Construction

JICA Advisors

welcome to the YCDC  
School of Engineers.

No Entrance Examination 😊

JICA Advisor (TEC) 2 09/10/2015

Review

Do you have questions about  
the FIDIC Conditions of Contract ?  
(MDB Harmonised Edition)  
(Pink Book)

JICA Advisor (TEC) 3 09/10/2015

Tender Documents  
(JICA Sample)

- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA  
Loans (October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements  
Specifications  
Drawings  
Bills of Quantities  
Other Information
- \* Part 3 Conditions of Contract and Contract Forms

JICA Advisor (TEC) 4 09/10/2015

CONTENTS

1. What's Specification
2. General Specification
3. Particular Specification
4. Technical Specifications  
(Materials and Workmanship)  
- Civil, Building, BS and M and E
5. Question and Answer

JICA Advisor (TEC) 5 09/10/2015

GENERAL CONDITIONS  
(FIDIC MDB Harmonised Edition)

Clause 1 General Provisions

- \* 1.1.4.10 "**Specification**" means the document entitled specification, as included in the Contract, and any additions and modifications to the specification in accordance with the Contract. **Such document specifies the Works.**
- \* 1.8 The **Specification** and Drawings shall be in the custody and care of the Employer.

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## GENERAL CONDITIONS (FIDIC MDB Harmonised Edition)

Clause 1 General Provisions

- \* 1.4 law and language
- \* **1.5 Priority of Documents**
- \* 1.6 Contract Agreement
- \* 1.8 Care and Supply Documents
- \* 1.13 Compliance with Laws

JICA Advisor (TEC) 7 09/03/2015

## Priority of Documents

GCC Sub-Clause 1.5

- \* the Contract Agreement (if any),
- \* the Letter of Acceptance,
- \* the Letter of Tender,
- \* the Particular Conditions – Part A,
- \* the Particular Conditions – Part B,
- \* these General Conditions,
- \* the Specification,
- \* the Drawings, and
- \* the Schedules (BOQ etc.) and any other documents forming part of the Contract.

} MDB Version

JICA Advisor (TEC) 8 09/03/2015

## Tender Price

Clause 1 General Provisions

- \* **1.1.1.8 “Tender”** means the Letter of Tender and all other documents which the contractor submitted with the Letter of Tender, as included in the Contract.
- \* **1.1.4.1 “Accepted Contract Amount”** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.

**Tenderer prices his Tender based on the Specification, Drawings and Programme.**

JICA Advisor (TEC) 9 09/03/2015

## GENERAL CONDITIONS (FIDIC MDB Harmonised Edition)

Clause 2 **The Employer**

- \* 2.1 Right of Access to the Site •••• (?) means **‘Provide Construction Site’**
- \* 2.2 Permits, Licenses or Approval The Employer shall provide •••reasonable assistance ••• (b) (ii) for the delivery of Goods, including clearance through customs,•••

JICA Advisor (TEC) 10 09/03/2015

## GENERAL CONDITIONS (FIDIC MDB Harmonised Edition)

Clause 3 **The Engineer**

- \* 3.1 Engineer’s Duty and Authority  
The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract.  
(a) •••the Engineer shall be deemed to act for the Employer. ••••• (?)  
••• the Engineer shall make a fair determination in accordance with the Contract•••

JICA Advisor (TEC) 11 09/03/2015

## GENERAL CONDITIONS (FIDIC MDB Harmonised Edition)

Clause 4 **The Contractor**

- \* 4.1 Contractor’s General Obligations  
The Contractor shall design•••, execute and complete the Works in accordance with the Contract ••• (b) these Contractor’s Documents shall be in accordance with the Specification and Drawings,
- \* 4.18 Protection of the Environment  
the Contractor’s activities shall not exceed the values stated in the Specification

JICA Advisor (TEC) 12 09/03/2015

**GENERAL CONDITIONS**  
(FIDIC MDB Harmonised Edition)

Clause 6 Staff and Labour

- \* 6.1 Engagement of Staff and Labour  
Expect as otherwise stated in **the Specification**, the Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, feeding, transport, and, when appropriate, housing.

JICA Advisor (TEC) 13 09/03/2015

**GENERAL CONDITIONS**  
(FIDIC MDB Harmonised Edition)

Clause 7 Plants, Materials and Workmanship

- \* 7.2 Samples
- \* 7.3 Inspection
- \* 7.4 Testing
- \* 7.5 Rejection
- \* 7.6 Remedial Work
- \* 7.7 Ownership of Plant and Materials

JICA Advisor (TEC) 14 09/03/2015

**GENERAL CONDITIONS**  
(FIDIC MDB Harmonised Edition)

Clause 9 Tests on Completion

- \* 9.1 Contractor's Obligation
- \* 9.2 Delayed Tests
- \* 9.3 Retesting
- \* 9.4 Failure to Pass Tests on Completion

JICA Advisor (TEC) 15 09/03/2015

**Works Requirements**

Sample Specifications

- \* General Specification
- \* Particular Specification
- \* Technical Specification (Materials and **Workmanship**)
  - Civil
  - Building (Architectural Building Works and Finishes)
  - Building Services (General and Particular)
  - Mechanical and Electrical including SCADA

General and Particular

JICA Advisor (TEC) 16 09/03/2015

**General Specification (1/2)**

- \* General
- \* The Site
- \* Planning, Programming and Progress Monitoring
- \* Health and Safety
- \* Environmental Requirements
- \* Quality Management
- \* Contractor's Organisation and Superintendence
- \* The Works

JICA Advisor (TEC) 17 09/03/2015

**General Specification (2/2)**

- \* Traffic and Roads
- \* Plant Materials
- \* Temporary Utility (Electricity) Supply
- \* ABWF and Building Services
- \* Document Management
- \* Testing and Commissioning
- \* Supply of Spare Parts
- \* Training
- \* Risk Management

JICA Advisor (TEC) 18 09/03/2015

### General Specification (1/17) General

- \* GS1.2 Definitions
- \* GS1.4 Materials and Workmanship  
The Works shall be carried out in accordance with the **Specification** and the Drawings.
- \* GS1.8 Initial Land Record Survey
- \* GS1.9 As-Built Record Survey
- \* GS1.11 Standards
- \* GS1.12 Employer's Drawings
- \* GS1.16 Design Requirement

JICA Advisor (TEC) 19 09/03/2015

### General Specification (2/17) The Site

- \* GS2.1 Site Availability
- \* GS2.3 Site Services
- \* GS2.4 Site and Work to be kept Clean
- \* GS2.6 Site Security
- \* GS2.9 Work in the Dry
- \* GS2.11 Fences and Signs on the Site
- \* GS2.15 Control of Pests, Vermin and Mosquitoes
- \* GS2.19 Drinking Water
- \* GS2.20 Toilet Facilities
- \* GS2.23 Workers' Rest Area

JICA Advisor (TEC) 20 09/03/2015

### General Specification (3/17) Planning, Programming & Monitoring

- \* GS3.1 Planning and Programming
- \* GS3.2 Progress Monitoring
- \* GS3.4 General Programme Requirements
- \* GS3.5 Works Programme
- \* GS3.7 Monthly Progress Report  
executive summary  
safety, quality and environmental aspect  
programme and progress  
financial and contractual matters
- \* GS3.8 Progress Meeting

JICA Advisor (TEC) 21 09/03/2015

### General Specification (4/17) Health and Safety

- \* GS4.6 Health and Safety Plan
- \* GS4.9 Safety Inspections
- \* GS4.10 Reporting of Incidents and Accidents
- \* GS4.13 Safety Meetings
- \* GS4.14 Emergency Procedures and Facilities
- \* GS4.15 First Aid Facilities
- \* GS4.16 Lifting Appliances and Lifting Gears
- \* GS4.17 Fire Precaution
- \* GS4.18 Dangerous Goods and Substances
- \* GS4.19 Excavation and Floor Openings
- \* GS4.23 Personnel Protective Equipment

JICA Advisor (TEC) 22 09/03/2015

### General Specification (5/17) Environmental Requirements

- \* GS5.2 Environmental Management Plan
- \* GS5.3 Air Quality
- \* GS5.4 Water Quality
- \* GS5.5 Waste Management
- \* GS5.6 Noise Control
- \* GS5.7 Protection on Existing Streams or Rivers

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### General Specification (6/17) Quality Management

- \* GS6.2 Quality Plan
- \* GS6.3 Quality Audit
- \* GS6.4 Manufacturer's Quality Assurance
- \* GS6.5 Inspection and Testing Plan
- \* GS6.7 Samples for Testing
- \* GS6.9 Quality Control Requirements
- \* GS6.10 Quality Hold Point
- \* GS6.11 Quality Control Point
- \* GS6.14 Testing Agencies and Equipment
- \* GS6.15 Reports of Tests

JICA Advisor (TEC) 24 09/03/2015



### General Specification (7/17) Contractor's Organisation

- \* GS7.1 Contractor's Organisation
- \* GS7.2 Surveyor
- \* GS7.3 Safety Personnel
- \* GS7.4 Planning and Programming Engineer
- \* GS7.5 Contractor's Representative

JICA Advisor (TEC) 25 09/03/2015

### General Specification (8/17) The Works

- \* GS8.1 Methods of Construction
- \* GS8.2 Temporary Works
- \* GS8.3 Normal Working Hours
- \* GS8.5 Construction Restraints
- \* GS8.8 Protection of Work
- \* GS8.10 Watercourses and Drainage Systems
- \* GS8.11 Utilities
- \* GS8.17 the Engineer's Site Accommodation
- \* GS8.18 the Contractor's Site Accommodation

JICA Advisor (TEC) 26 09/03/2015

### General Specification (9/17) Traffic and Roads

- \* GS9.2 Access to and from Areas of the Site
- \* GS9.4 Temporary Traffic Diversion Schemes
- \* GS9.6 Dust Control
- \* GS9.7 Pedestrian Requirements
- \* GS9.8 Temporary Street Lighting
- \* GS9.9 Reinstatement of Roads and Footpaths

JICA Advisor (TEC) 27 09/03/2015

### General Specification (10/17) Plant and Materials

- \* GS10.3 Places of Manufacture
- \* GS10.4 Submission of Particulars
- \* GS10.7 Standard Specifications
- \* GS10.8 Testing and Sampling
- \* GS10.9 Tolerances
- \* GS10.12 Removal of Materials or Plant from Site

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### General Specification (11/17) Utilities

- \* GS11.1 Works on Site
- \* GS11.5 Types of Distribution Supply
- \* GS11.6 Protection of Circuit
- \* GS11.7 Earthing
- \* GS11.8 Plugs, Socket Outlets and Couplers
- \* GS11.9 Cables
- \* GS11.10 Lighting Installation
- \* GS11.14 Payment of Charges

JICA Advisor (TEC) 29 09/03/2015

### General Specification (12/17) ABWF and Building Services

- \* GS12.3 Coordination
- \* GS12.4 Structural E & M Drawings (SEM)
- \* GS12.5 Design and Documentation
- \* GS12.7 Delivery Route Drawings

JICA Advisor (TEC) 30 09/03/2015

**General Specification (13/17)**  
**Document Management**

- \* GS13.2 As-Built Drawings
- \* GS13.3 O & M Manuals
- \* GS13.4 Project Records

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**General Specification (14/17)**  
**Testing and Commissioning**

- \* GS14.2 Testing and Commissioning Services
- \* GS14.3 System Acceptance Tests
- \* GS14.4 Completion Tests

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**General Specification (15/17)**  
**Supply of Spare Parts**

- \* GS15.1 Supply of Parts
- \* GS15.2 Packaging and Storage

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**General Specification (16/17)**  
**Training**

- \* a) schedule of training course;
- \* b) objective, class size and duration of each training courses;
- \* c) training materials and facilities
- \* d) qualifications and experience level necessary for the training;
- \* e) instructor's qualifications; and
- \* f) recommendation.

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**General Specification (17/17)**  
**Risk Management**

- \* GS16.1 Design for Safety and Constructability
- \* GS16.2 System Assurance Requirements

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**Particular Specification (1/5)**

- \* Project Information
- \* Geotechnical Information
- \* Specification and Drawings
- \* Design Responsibility
- \* Coordination of Works
- \* Preliminary Works
- \* Availability and Use of Site

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### Particular Specification (2/5)

- \* Construction Programme
- \* Construction Sequence and Method
- \* Temporary Site Facilities
- \* Soil Disposal and Borrow Pits
- \* Reinstatement and Reconstruction
- \* Statutory Authorities
- \* Utilities

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### Particular Specification (3/5)

- \* Traffic and Pedestrian Requirements
- \* Engineer's Site Accommodation
- \* Requirements for Health and Safety
- \* Environmental and Quality Management
- \* Submissions and Records
- \* Temporary Works
- \* As-built Drawings

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### Particular Specification (4/5)

- \* Operating and Maintenance Manual
- \* Testing and Commissioning
- \* Training
- \* Laboratory Equipment
- \* Access to Property
- \* Public Relations

JICA Advisor (TEC) 39 09/03/2015

### Particular Specification (5/5) Appendix

- \* A: List of Drawings
- \* B: Engineer's Preliminary Programme
- \* C: Works Area Plans
- \* D: Fencing Plan for the STP Works Area
- \* E: Schedule of Access Dates for Works Areas
- \* F: Engineer's and Employer's Site Accommodation, Facilities and Equipment

JICA Advisor (TEC) 40 09/03/2015

### Technical Specifications (Materials and **Workmanship**)

- \* Civil
- \* Building (Architectural Building Works and Finishes)
- \* Building Services (General and Particular)
  - Mechanical (Air Conditioning),
  - Electrical (Lighting),
  - Fire Services and
  - Hydraulics (Water supply and Sanitary)
- \* Mechanical and Electrical Plant including SCADA General and Particular

JICA Advisor (TEC) 41 09/03/2015

### The Contractor, The Engineer (Consultant), YCDC, Subcontractors, JICA and all stakeholders



**Work Together for the Successful Future !**

JICA Advisor (TEC) 42 09/03/2015

Question and Answer

**Ever Forward, Step by Step**



**We are Civil Engineers !**

JICA Advisor (TEC) 43 09/10/2015

Next Seminar in November

- \* Part 1 Tender Procedures
  - Sample Bidding Documents under Japanese ODA Loans (October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements
  - Specifications
  - Drawings
  - Bills of Quantities
  - Other Information
- \* Part 3 Conditions of Contract and Contract Forms
- \* Programme, Project Management including Safety

JICA Advisor (TEC) 44 09/10/2015

**Kyae Zue Thin Bar Taē**  
**Arigatou gozaimashita**



JICA Advisor (TEC) 45 09/10/2015

JICA assisted Capacity Development on  
Lagunbyin Water Treatment Plant under  
Greater Yangon Water Supply Improvement Project  
implemented by YCDC

## Project Management

Seminar No 10, 12 November 2014  
JICA Advisors for Monitoring of LWTP Construction

## Faculty of Civil Engineering

JICA Advisors welcome  
YCDC colleagues  
to the School of Engineers.

JICA Advisor (TEC) 2 06/04/2015

## Subject of Seminar and JICA Sample Tender Documents

- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA  
Loans (October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements  
Specifications (October)  
Drawings  
Bills of Quantities  
Other Information
- \* Part 3 Conditions of Contract and Contract Forms (September)
- \* Programme, Project Management including Safety (November)

JICA Advisor (TEC) 3 06/04/2015

## Review

Do you have questions about  
the Contract Documents including  
FIDIC Conditions of Contract  
(MDB Harmonised Edition)  
and Specifications ?



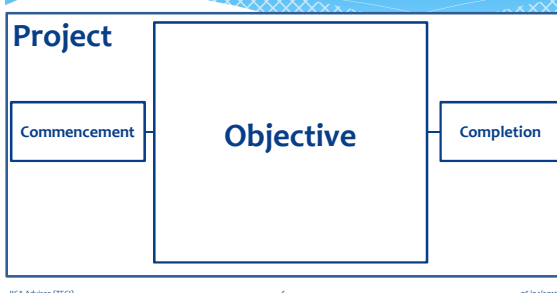
JICA Advisor (TEC) 4 06/04/2015

## CONTENTS

- \* Project ?
- \* Project Management under FIDIC Contract
- \* Safety, Quality and Environment
- \* Scope and Method of Construction
- \* Time, Planning and Programming
- \* Cost and Financial Control
- \* Reporting and Meeting
- \* Staff
- \* Question and Answer

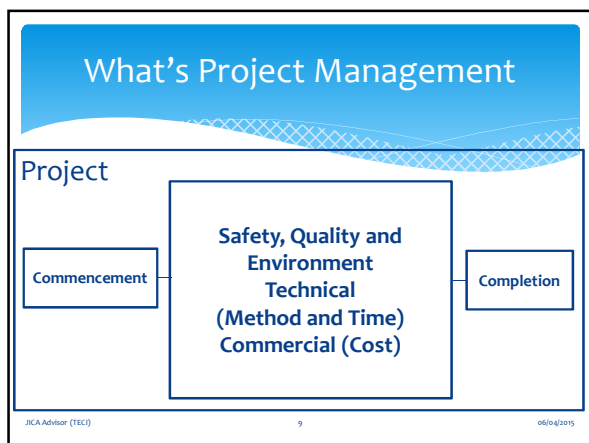
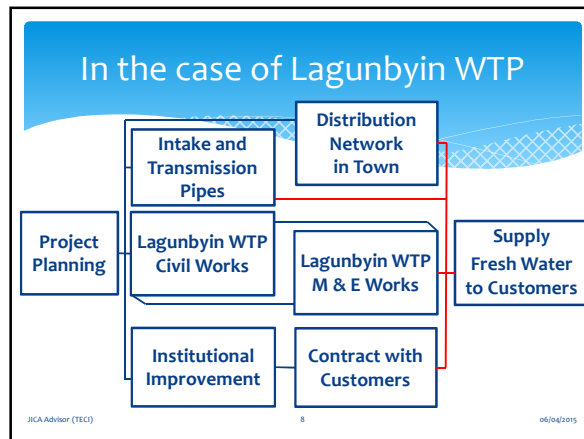
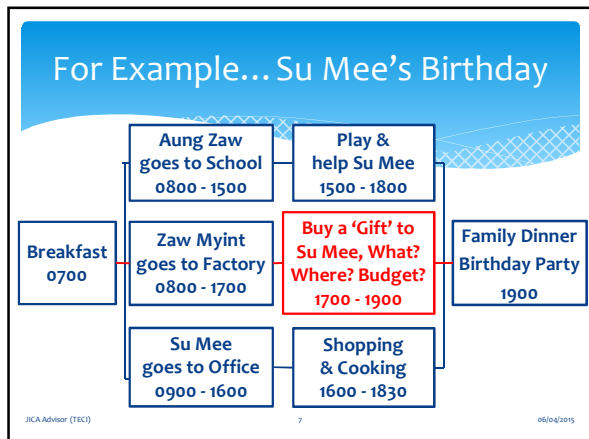
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## What's 'Project' ?



JICA Advisor (TEC) 6 06/04/2015





### The Employer, The Engineer and The Contractor under FIDIC Contract

**The Employer** prepare the requirements for his objective.  
Also the Employer appoint the Engineer and employ the Contractor.

**The Engineer** will administer the Works in accordance with the Contract.

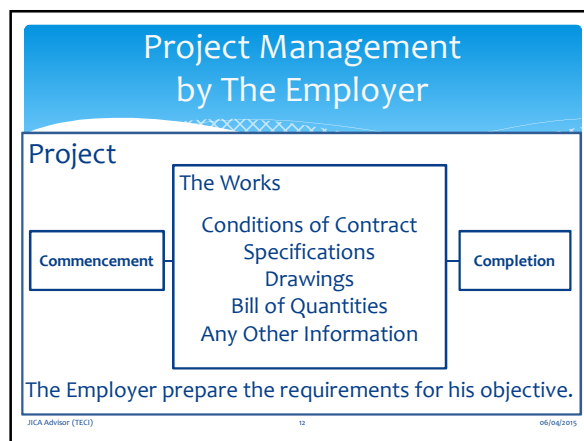
**The Contractor** will execute and complete the Works in accordance with the Contract.

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### The Employer

- \* 2.1 ... The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time stated in the Contract Data ...;
- \* 2.2 ... The Employer shall provide, at the request of the Contractor, such reasonable assistance as to allow the Contractor to obtain property ...;
- \* 2.3 (a) ... co-operate with the Contractor ...; and
- \* 2.3 (b) take actions similar to those which the Contractor is required to take **Safety Procedures** and **Protection of the Environment** ....

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## The Engineer

- \* 1.1.2.4 ... the person appointed by the Employer...
- \* 3.1 (a) ... the Engineer shall be deemed to act for the Employer.
- \* 3.5 ... the Engineer shall make a **fair** determination in accordance with the Contract...

The Engineer administer the Contract  
In accordance with the Contract

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## Project Management by The Engineer

Project within the Contract = FIDIC MDB (Pink Book)  
= **Authority delegated** by the Employer

The Works

Commencement

Specifications  
Drawings  
Bill of Quantities

Completion

The Engineer administer the Works  
in accordance with Specifications and Drawings

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## The Contractor

- \* 1.1.2.3 ... the person(s) named as contractor...
- \* 4.1 Contractor's General Obligations  
The Contractor shall design..., execute and **complete** the Works in accordance with the Contract...

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## Project Management by The Contractor

Project

The Works

Commencement

Specifications  
Drawings  
Bill of Quantities

Completion

The Contractor execute and complete the Works  
in accordance with Specifications and Drawings

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## Management of Safety, Quality and Environment

International Standards

- \* OHSAS 18001  
Occupational Health and Safety Assessment Series  
➡ "Safety Plan"
- \* ISO 9001  
Quality Assurance  
➡ "Quality Assurance Manual"
- \* ISO 14001  
Environmental Manage System (EMS)  
➡ "Environmental Management Plan"

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## Health and Safety

- \* **Risks and Measures**  
Review the method of construction and identify potential risks and preventive measures to be taken.
- \* **Identify responsibility in the Organisation**  
The senior management of the organisation should be responsible for Health and Safety of its staff and workers.
- \* **Minimise risk to employees**  
Health and Safety is an interest of the organisation.

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### Safety on Site (1/5)

Site workers with proper wearing

Good Practice

No Sandals  
No Longy  
Wear Safety Boots

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### Safety on Site (2/5)

Electric Cable

Domestic Plugs Should be heavy duty waterproof type

Improper wiring If flooded, electrical current in water

SAFETY FIRST

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### Safety on Site (3/5)

လုပ်ငန်းခွင်အတွင်း  
အန္တရာယ်ကင်းရှင်းရေးသည်  
ပထမ  
Safety First

Recommended Writing on Sign Board

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### Safety on Site (4/5)

Remove Used Nails  
Good Safety Practice

Used Nails

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### Safety on Site (5/5)

Acetylene Cylinder to be stand while  
Oxygen Cylinder can be laid down.  
Back fire arrestor should be installed.

Except this steps

Good Safety Practice

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### Quality Management

Components  
Quality Planning  
Quality Control  
Quality Assurance  
Quality Improvement

Principle  
1. Leadership  
2. Customer Focus  
3. Process Approach  
4. Involvement of People  
5. Continual Improvement  
6. System approach to Management  
7. Factual approach to Decision Making  
8. Mutual Beneficial Supplier Relationships

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## Quality Control

- \* The observation techniques and activities used to fulfill requirements for quality.

**Quality Assurance:**  
the planned and systematic activities implemented in a quality system so that quality requirements for services will be fulfilled.



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## Quality Assurance

1. Organisation's Guarantee that the services it offers meets the accepted quality standards;
2. Focused on providing confidence that quality requirements will be fulfilled;
3. Process and procedures for ensuring that qualifications, assessment and programme meet the standards;
4. Assess and improve the merit and its compliance with the standards; and
5. Process by which the achievement of the standard is measured.



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## Quality Improvement (1/2)

**Curing**



**Kickers**



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## Quality Improvement (2/2)



**Wall Concreting**







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## Document Control



- \* Correspondences including Meeting Minutes (Notes)
  - Master Files (going out and incoming in sequential order)
  - General Files (subject by subject)
  - Working Files (particular topics)
- \* Programme and Method Statement
- \* Material Submissions (including samples)
- \* Tests and Inspection Sheets (including survey reports)
- \* Measurement Sheets (including bending schedules)
- \* Drawings and their revisions (A0 and A3 sizes)



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## Environmental Protection

- \* Sustainable Improvement of Environmental Protection
- \* Minimise affection to environment as a result of activities
- \* Plan – Do – Check – Act

- \* Provide "EMP" (Environmental Management Plan)

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### Air Pollution



Cement Storage at the Batching Plant

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### Noise Control



Low Noise Generator

Low Noise Breakers

Phooooh!

Booooh!

Phu, Phu, Phu!

Bhu, Bhu, Bhu!

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### Vibration Control



Low Vibration Construction Equipment

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### Water Pollution

Ngamoeyeik Creek in Town



Intake at Ngamoeyeik Creek for Lagunbyin WTP

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### Waste Treatment



Before

After

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### Health and Environment



Swimming ?

I am worry about my health and environment around here...



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### A first step for Environmental Friendly Action

Store reusable materials in order

Maintain Access Road

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### Scope Control

- \* The Scope of Works are specified in the Tender Document. They are described in:-
  - 1 Specifications;
  - 2 Drawings; and
  - 3 Bill of Quantities.
- \* If the Scope is changed, Time and Cost will be changed.

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### Construction Methods

<b>Temporary Works</b> Earth Work Cofferdam Support Form Work Trenchless Tunnels etc.	<b>Permanent Works</b> Foundation Reinforcement Bar Concrete ABWF Building Services Plant Steel Structure Pipes etc.
--	---

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### Areas of Concern - Waterproofing

Waterproof Painting

Movement Joint

Surface Waterstop

**Water retaining structures must be watertight.**

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### Time Control

- \* Establish a baseline programme based on the information available at the time of Tender;
- \* Record actual progress of the works;
- \* Identify a reason why the actual progress is different from the planned progress (delay or ahead of the baseline programme);
- \* Review sequence, methods and resources of the works;
- \* Revise the programme to minimise delay; and
- \* Monitor the progress of the Works based on the revised PGM.

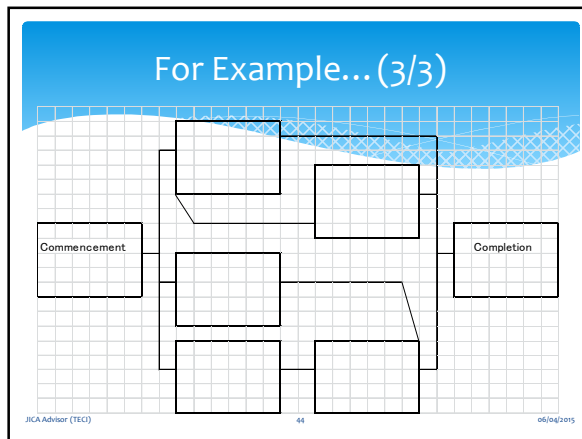
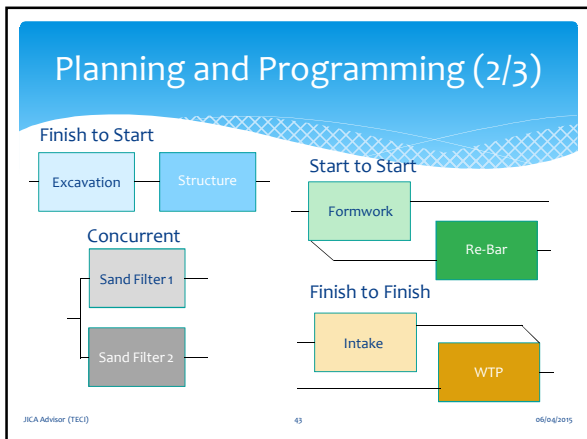
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### Planning and Programming (1/3)

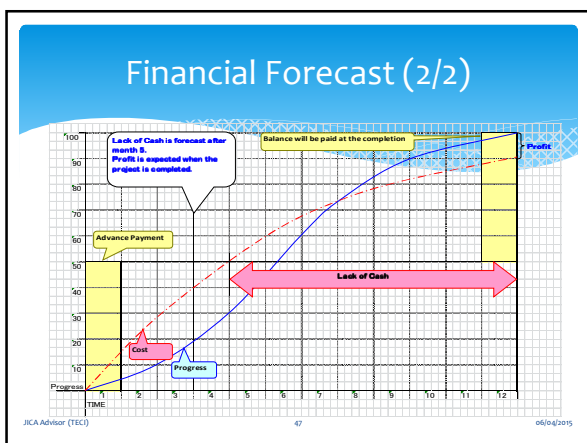
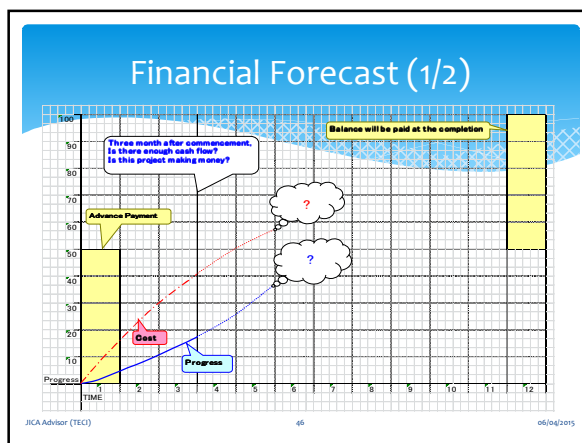
- 1 Identify Activities  
Review method of construction
- 2 Calculate quantity of each activity  
m<sup>3</sup>, m<sup>2</sup>, m, ton, no etc.
- 3 Assess progress rate of each activity  
per month, per week, per day etc.
- 4 Check Relationship between Activities  
Review the sequence of the works
- 5 Draw strategic plans in every 3 to 6 month  
Check performance and access on site

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- ### Cost Control
- \* Principle of Cost Control  
Budget vs Cost
  - \* Information required for Cost Control
    - Prepare Bill of Quantities based on the requirements in Specifications and Drawings
    - Price BOQ by estimating each activity
    - Plan monthly budget in accordance with the PGM
    - Forecast monthly cost and prepare S-Curve
    - Cost keeping in accordance with Cost Centre
    - Check Cash Flow
  - \* Final Forecast
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- ### Reporting
- \* Monthly Report
    - Executive Summary (Status of the Project)
    - Safety, QA and Environmental Protection (How perform)
    - Design (Scope Control)
    - Construction (Method Control)
    - Progress and Programme (Time Control)
    - Suppliers and Contractors (Quality Control)
    - Commercial
      - Cost and Final Forecast (Cost Control)
      - Variations and Claims (Contract Administration)
      - Cash Flow (Financial Control)
      - Staff (Human Resources)
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## Meetings

- \* Daily Meeting  
Site meeting among site staff from each party
- \* Weekly Meeting  
Progress review meeting between engineers from each party
- \* Monthly Meeting  
Technical and commercial review meeting between management of each party
- \* Steering Committee Meeting  
between senior management and Project Office

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## Organisation and Staff Management

To be considered

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## Contract Administration by the Engineer (FIDIC Contract)

**JICA**

Authority delegated

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## Contract Administration by the Employer and his Staff

**JICA**

Authority not delegated

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## The Contractor, The Engineer, YCDC, Subcontractors, JICA and all stakeholders

Strive to be Successful with Team Work !

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## Question and Answer

Ever Forward, a Step by a Step

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## Next Seminar

- \* Part 1 Tender Procedures
  - Sample Bidding Documents under Japanese ODA Loans (October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements
  - Specifications (October)
  - Drawings
  - Bills of Quantities
  - Other Information
- \* Part 3 Conditions of Contract and Contract Forms (September)
- \* Programme, Project Management including Safety (November)

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# ကျေးဇူးတင်ပါတယ်

Arigatou gozaimashita



JICA Advisor (TEC) 56 06/04/2015

JICA Advisors welcome  
YCDC colleagues  
to the Faculty of Civil Engineering.

JICA assisted Capacity Development on  
Lagunbyin Water Treatment Plant under  
Greater Yangon Water Supply Improvement Project  
implemented by YCDC

## Programming and Water Retaining Structures

Seminar No 11, 21 January 2015  
JICA Advisors for Monitoring of LWTP Construction

### Subject of Seminars and JICA Sample Tender Documents

- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA Loans  
(October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements  
Specifications (October), Drawings, Bills of Quantities  
and Other Information
- \* Part 3 Conditions of Contract and Contract Forms (September)
- \* Project Management including Safety (November)
- \* Programming and Water Retaining Structures (January)
- \* PQ Document and Instruction to Tenderers

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### Back Number

- 1 Safety, Quality and Environmental (on site)
- 2, 3 Workmanship (on site)
- 4, 5 Construction Details (on site)
- 6 Site Management (on site)
- 7 Meetings and Reports (on site)
- 8 Conditions of Contract (at HO)
- 9 Specifications (at HO)
- 10 Project Management (at HO)

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## Review of Previous Seminars

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### The Employer, The Engineer and The Contractor under the FIDIC Contract

**The Employer** prepare the requirements for his objective.  
Also the Employer appoint the Engineer  
and employ the Contractor.

**The Engineer** will administer the Works  
in accordance with the Contract.

**The Contractor** will execute and complete the Works  
in accordance with the Contract.

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### The Employer

- \* 1.8 The **Specification** and **Drawings** shall be...;
- \* 2.1 ... The Employer shall give the Contractor right of access to, and possession of, ... the **Site**...;
- \* 2.3 (a) ... **co-operate with the Contractor** ...; and
- \* 2.3 (b) take actions similar to those which the Contractor is required to take **Safety** Procedures and Protection of the **Environment** ....

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### The Engineer

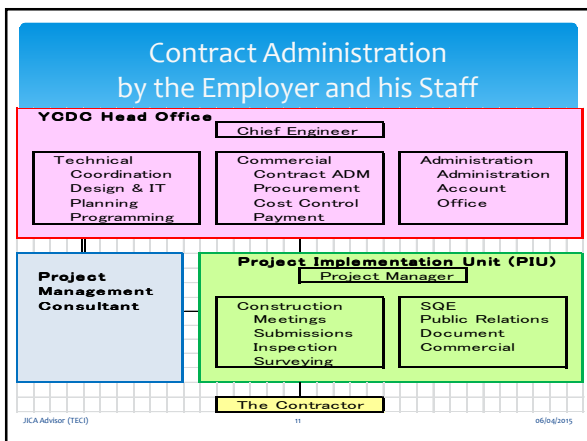
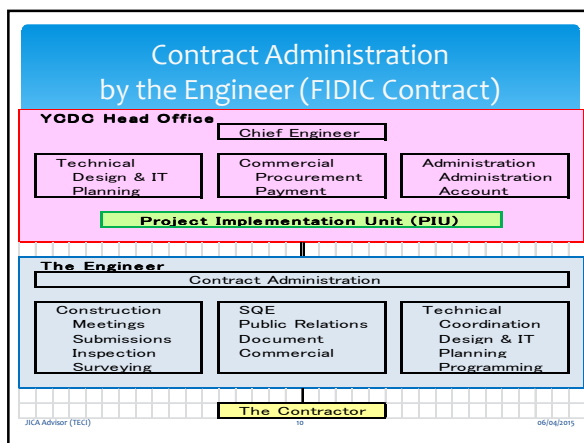
- \* 1.1.2.4 ... the person appointed by the Employer...
- \* 3.1 (a) ... the Engineer shall be deemed **to act for the Employer**.
- \* 3.5 ... the Engineer shall **make a fair determination** in accordance with the Contract...

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### The Contractor

- \* 1.1.2.3 ... the person(s) named as contractor...
- \* 4.1 Contractor's General Obligations  
The Contractor shall **design**..., **execute** and **complete the Works** in accordance with the Contract...

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### Are you ready for JICA Loan Project?

Do you have questions about the Contract, Specifications, Project management and Construction Details or anything ?

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### Topics of Today

- \* Planning and Programming
  - \* Time Control
- \* Structures at Water Treatment Plant
- \* Waterproofing and Construction Joints
  - \* Remedial Works
- \* Question and Answer and Next Topics

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### Planning and Programming

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### Construction Methods

Establish method of construction for each activity

<p><b>Temporary Works</b></p> <ul style="list-style-type: none"> <li>Earth Work</li> <li>Cofferdam</li> <li>Support</li> <li>Form Work</li> <li>Trenchless Technique</li> <li>Tunnels</li> <li>Traffics and Utilities</li> <li>etc.</li> </ul>	<p><b>Permanent Works</b></p> <ul style="list-style-type: none"> <li>Foundation Structures</li> <li>ABWF</li> <li>Building Services</li> <li>Plant (M &amp; E)</li> <li>Pipe Works</li> <li>Road Works</li> <li>Landscape</li> <li>etc.</li> </ul>
--	--


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### Construction Sequence


- \* General construction sequence shall be :-
  - 1 from the far end to the near end, because of availability of accesses (must maintain two);
  - 2 from the deeper section to the shallower portion, because of ground water;
  - 3 from RC structures, because of coordination between Civil, ABWF, BS and M & E; and
  - 4 external works and landscape as the last activities, because of possible damages.

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### Earth Work – Initial and Last Activities



Pre-Sedimentation Pond to be excavated 3m more



Backfilling suitable or unsuitable materials

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### External Works in Early Stage ?

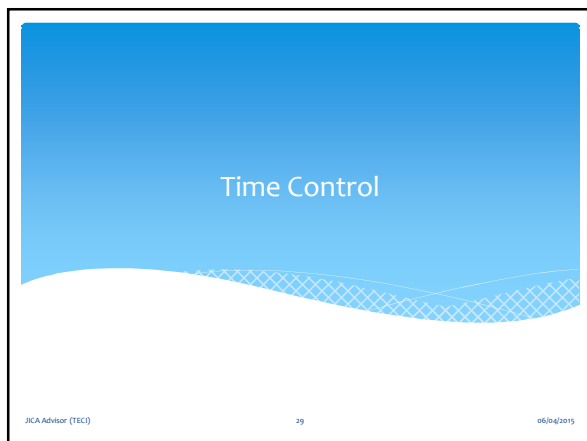
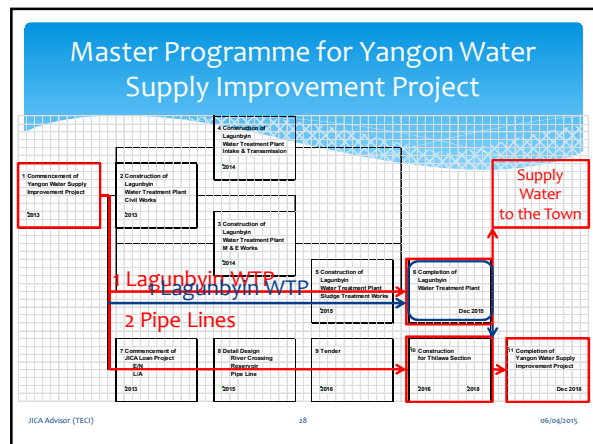
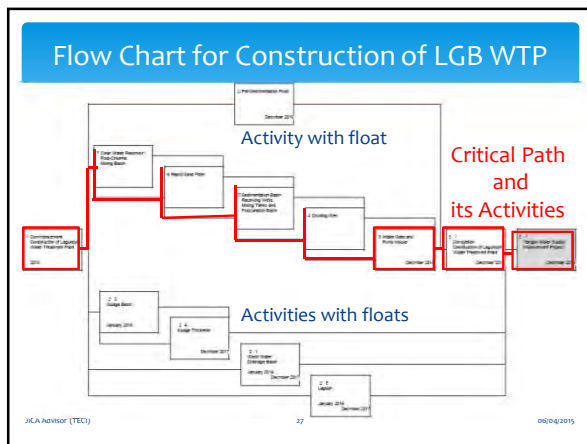
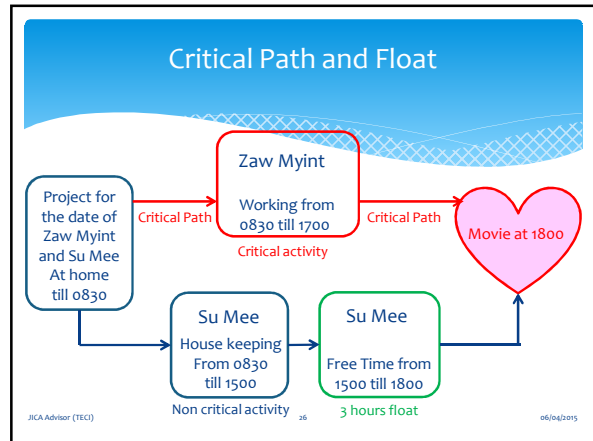
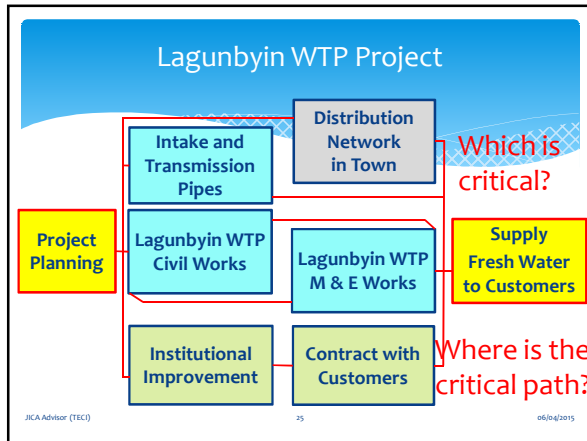



External works in early days may be damaged by construction activities.

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- ### Time Control (1/2)
- \* Establish the baseline programme based on the information available at the time of Tender;
  - \* Confirm the critical path on the works programme;
  - \* Record actual progress of the works;
  - \* Identify reasons why the actual progress is different from the planned progress (ahead or behind of the baseline programme);
  - \* Review the sequence, methods and resources of the works;
  - \* Establish recovery measures;
  - \* Revise the programme to minimise delay; and
  - \* Monitor the progress of the works based on the revised PGM.
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### Time Control (2/2)

During course of the works:-

- 1 Review activities on the critical path; and
- 2 Review other activities against their floats.

If activities on the critical path are behind the planned timings:-

- 1 accelerate activities on the critical path; or
- 2 change sequence of the works and confirm new critical path.

If other activities are delayed against the planned schedules:-

- 1 accelerate activities; or
- 2 change sequence of the works and confirm they are out of critical path.

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### For Better Progress (1/2)



Maintain Access Road



Provide Safety Access

Improve Temporary Works

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### For Better Progress (2/2)



Before








After

Improve Temporary Works - Working Platform

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### Engineer's Magic Hand

-  Information (Specification and Drawings);
-  Access (Physical way to the Site);
-  Plant and Materials (Are they available?);
-  Workers (Do we have enough people?); and
-  Money (Making money? About cash flow?).

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## Structures at Water Treatment Plant

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### Water Retaining Structures

- \* Watertightness of the structure = the flow of water from inside the structure to outside, and the infiltration of water from the surrounding areas into the structure are effectively prevented.
- \* Watertight concrete is achieved by :-
  - 1 design
  - 2 materials and
  - 3 construction method and good workmanship

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### Design (1/2)

Study and Review:-

- \* Requirements (by The Employer)
- \* Serviceability (Capability and Performance)
- \* Design (including Architectural Design)
- \* Durability (Materials, Specifications)
- \* Loads (Design Criteria, Structural Design)
- \* Joints Details (Watertightness)

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### Design (2/2)

Consider to avoid cracks and leakages:-

- 1 Movements due to shrinkage and creep;
- 2 Movements due to temperature and humidity;
- 3 Movements due to dissipation during hydration;
- 4 Damage to the concrete due to percolation of chemically aggressive liquid from outside;
- 5 Damage due to uneven settlement of foundations
- 6 Cracking of concrete caused by rusting bars; and
- 7 Hydrostatic uplift force

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### Workmanship

- \* Care of waterproofing membrane
- \* Installation of water bar and water stops
  - Center bulb water bar
  - Surface water bar
  - Hydrophilic water stops
- \* Installation of joint filler and preparation of construction joints
- \* Maintaining concrete cover (50~75mm)
- \* Operation of vibrators (enough but not too much)
- \* Scrabbling of concrete surface at construction joints
- \* Apply joint sealant and protection measures

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### Cosmetic Finish on Walls (1/2)



Inside of the Structure

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### Cosmetic Finish on Walls (2/2)



Outside of the Structure

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### Waterproofing Paint



Do you know how much this black paint is efficient for the flow of water from inside the structure to outside?

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### Actual Site Conditions

Waterproof Paint

Movement Joint

Surface Water stops

**Water retaining structures must be watertight.**

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## Waterproofing and Construction Joints

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### Cross Section of Box Culvert

Two coats of spray applied waterproofing or waterproofing membrane

Water stops

Key performed waterproofing

TYPICAL TUNNEL SECTION

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### Typical Waterproofing

Two coats of waterproofing spray (paint) or waterproofing membrane

Water stops

Key performed waterproofing

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### Roof Slab

Key performed waterproofing

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### Wall and Base Slab

Sealant

Hydrophilic strip

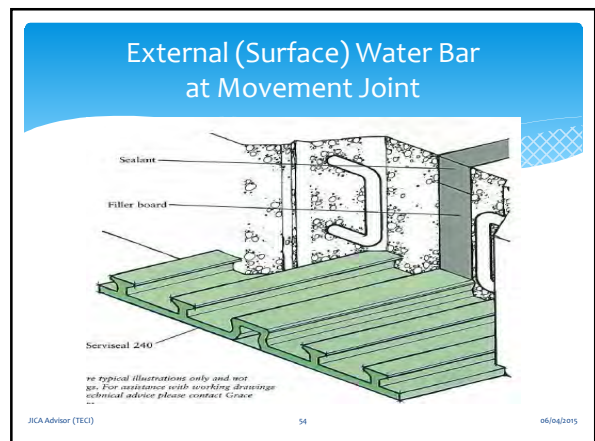
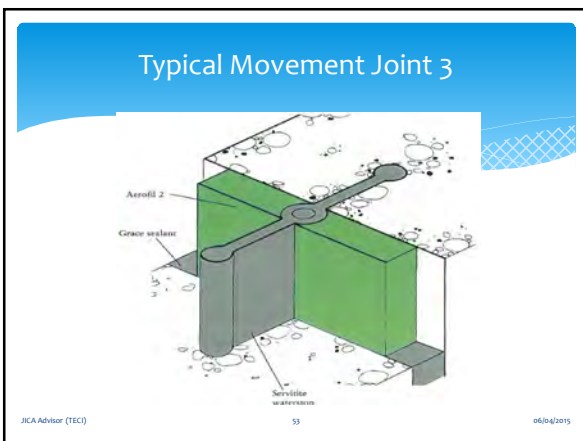
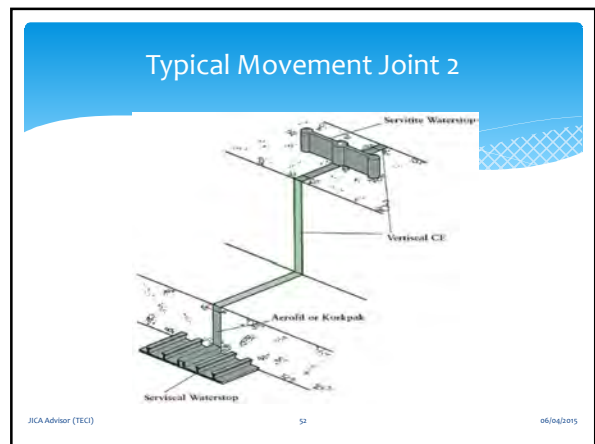
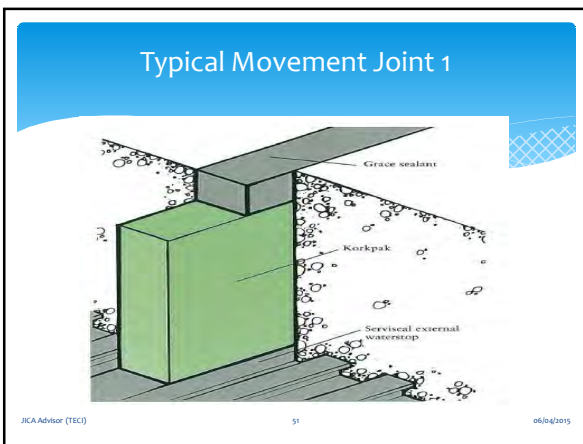
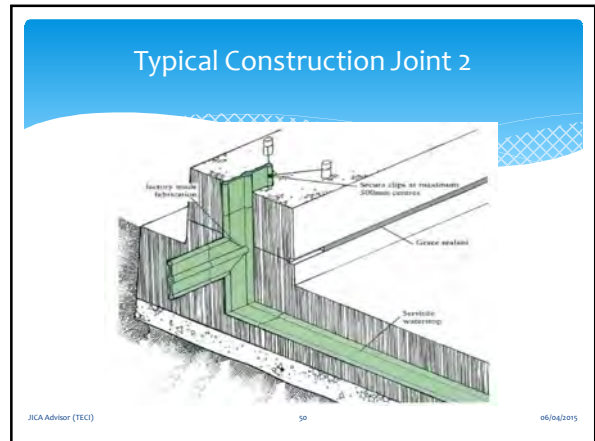
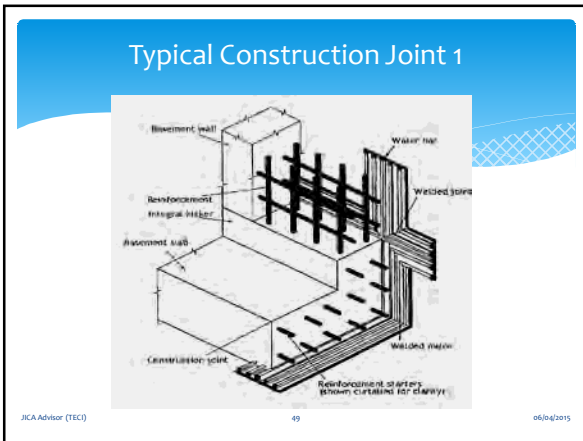
Centre bulb water bar

External Water bar

Waterproofing membrane

TYPICAL DETAILS FOR C.J. IN BASEMENT

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### Details of External Water Bar

**Vertical L**   **Reverse VL**   **Flat T**   **Flat X**

**Range of Sections - all dimensions nominal**

**Serviseal® 195**

**Serviseal® 240**

**Serviseal® K 320**

**Flat L**

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### Hydrophilic Strip (Waterstops)

**Adcor® 500S at Roof/wall joint**

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### Typical Buried Joint

**Typical buried joint detail**

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### Remedial Works

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### Stop Water !

- \* From inside
  - any finishing to the internal surface of the structures ?
  - epoxy coating
  - apply joint sealant at the movement joints
  - cement milk and/or epoxy grouting
- \* From outside
  - cement milk and/or epoxy grouting
  - apply water stops (plug)

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### Apply Joint Sealant

**Paraseal**

**Korkpak/Aerofil**

**Serviseal Waterstop as required**

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### Epoxy or Cement Milk Grout

Remedial grouting  
at Clear Water Reservoir

JICA Advisor (TEC) 61 06/04/2015

### Rapid-setting Plugging Mortar

JICA Advisor (TEC) 62 06/04/2015

### Recommendations

Remedial works and/or double handing does not help not only progress of the works but also they damage the financial aspect of the project.

Therefore,

- 1 proper design and proper planning;
- 2 proper materials and proper construction method; and
- 3 proper workmanship under proper supervisions

are highly recommended.

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### Design and Planning

Location of  
Construction Joint

Structure Design  
1 Beam support  
or  
2 Slab and Wall

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### Planning and Materials

Steel Form  
or  
Timber Form

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### Materials and Method

plywood shutter, t=18mm

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### Method and Workmanship




Before

After

JICA Advisor (TEC) 67 06/04/2015

Detailed description: This slide shows two photographs of a concrete surface. The 'Before' photo shows a rough, uneven surface with some protruding rebar. The 'After' photo shows a smooth, finished concrete surface with two circular holes.

### Workmanship and Supervision



A sample of concrete finish

JICA Advisor (TEC) 68 06/04/2015

Detailed description: This slide shows two photographs of a concrete wall. The left photo shows a close-up of a smooth concrete finish with several small circular holes. The right photo shows a concrete wall with an elevator shaft and a '2F' sign.

### Supplier of Building Materials

For example, 'resapol' of UK handles:-

- \* GRACE (US);
- \* Fosroc (UK);
- \* Sika (Swiss);
- \* BASF (Germany).

and

- \* Many other building materials suppliers are available on the internet.


JICA Advisor (TEC) 69 06/04/2015

### Question and Answer and Next Topics

JICA Advisor (TEC) 70 06/04/2015

### Question and Answer

#### Ever Forward, a Step by a Step



JICA Advisor (TEC) 71 06/04/2015

Detailed description: This slide features two photographs. The left photo shows a construction site with a blue canopy structure. The right photo shows a meeting room with people sitting around a table, discussing a project.

### The Contractor, The Engineer, YCDC, Subcontractors, JICA and all stakeholders



Strive to be Successful with Team Work !

JICA Advisor (TEC) 72 06/04/2015

Detailed description: This slide features a photograph of a wooden boat on a river, with several people on board. The background shows a lush green forest.

**Subject of Seminar and  
JICA Sample Tender Documents**

- \* Part 1 Tender Procedures  
Sample **Bidding Documents** under Japanese ODA Loans  
(October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements  
Specifications (October), **Drawings, Bills of Quantities  
and Other Information**
- \* Part 3 Conditions of Contract and Contract Forms (September)
- \* Project Management including Safety (November)
- \* Programme and Water Retaining Structures (January)
- \* **PQ Document and Instruction to Tenderers**

JICA Advisor (TEC) 73 06/04/2015

**ကျေးဇူးတင်ပါတယ်**  
**Arigatou gozaimashita**  
**Thank You**

**Safety First**  
**安全第一**



JICA Advisor (TEC) 74 06/04/2015






JICA Advisors welcome  
 YCDC colleagues  
 to the School of Magic  
 the Faculty of Civil Engineering.

JICA assisted Capacity Development on  
 Lagunbyin Water Treatment Plant under  
 Greater Yangon Water Supply Improvement Project  
 implemented by YCDC

**Prequalification,  
 Instructions to Tenderers  
 and Bill of Quantities**

Seminar No 12, 18 March 2015  
 JICA Advisors for Monitoring of LWTP Construction

Review of Previous Seminars

- Engineer's Magic Hand**  
**Engineers manage projects with five fingers!**
-  Information (Specification and Drawings);
  -  Access (Physical way to the Site);
  -  Plant and Materials (Are they available?);
  -  Workers (Do we have enough people?); and
  -  Money (Making money? About cash flow?).

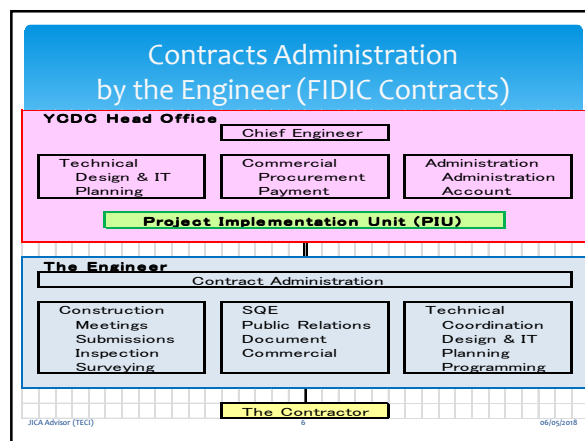
**The Employer, The Engineer and  
 The Contractor under FIDIC Contracts**

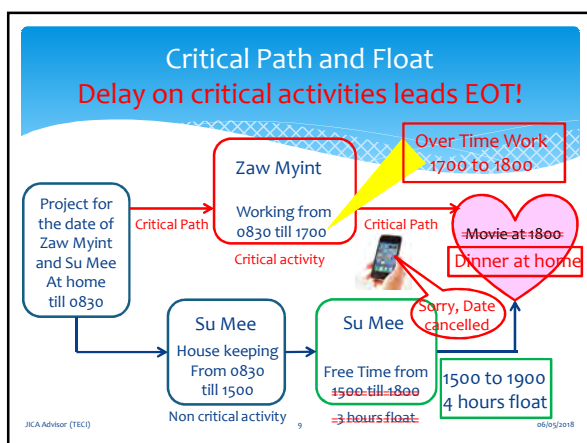
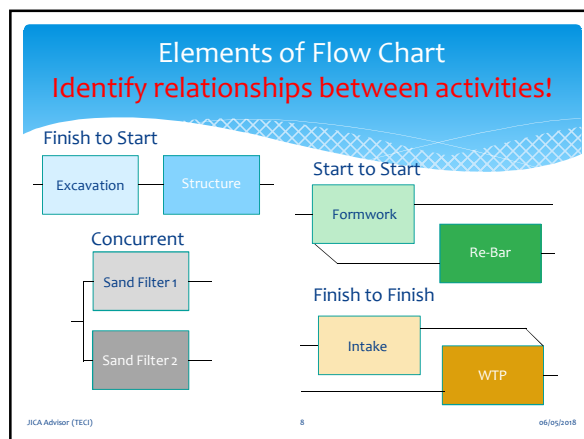
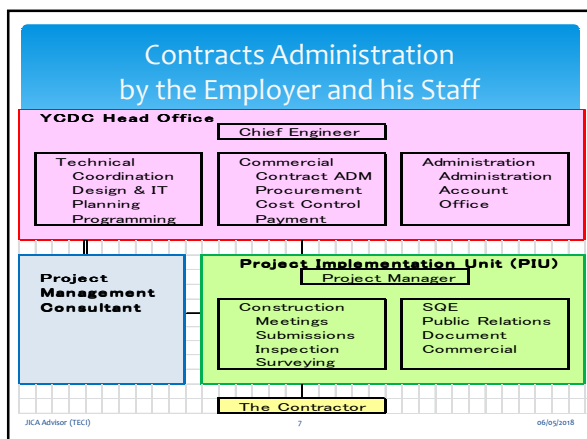
**Three Partners of Projects:-**

**The Employer** prepare the requirements for his objective.  
 Also the Employer appoint the Engineer  
 and employ the Contractor.

**The Engineer** will administer the Works  
 in accordance with the Contract.

**The Contractor** will execute and complete the Works  
 in accordance with the Contract.





### Are you ready for JICA Loan Projects?

Do you have any questions about the Contract, Specifications, Project management, Programme or Construction Details ?

JICA Advisor (TEC) 10 06/05/2018

- ### Subject of Seminars and JICA Sample Tender Documents
- \* Part 1 Tender Procedures  
 Sample Bidding Documents under Japanese ODA Loans (October 2012 version 1.0, JICA)
  - \* Part 2 Works Requirements  
 Specifications (October), Drawings, Bill of Quantities and Other Information
  - \* Part 3 Conditions of Contract and Contract Forms (September)
  - \* Project Management including Safety (November)
  - \* Programming and Water Retaining Structures (January)
  - \* PQ Document and Instructions to Tenderers
  - \* Construction Supervision and Contracts Administration
- JICA Advisor (TEC) 11 06/05/2018

- ### Topics of Today
- \* Prequalification
  - \* Instructions to Tenderers
  - \* Type of Contracts
  - \* Bill of Quantities
  - \* Question and Answer
  - \* Next Topics
- JICA Advisor (TEC) 12 06/05/2018



## Prequalification

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13

06/05/2018

## Objective of Prequalification

- \* The prequalification is to identify those who are interested and capable of undertaking the contract and to keep tendering cost minimum.
- \* Tenderers will only be invited from the list of pre-qualified contractors.
- \* The qualification requirements shall be limited to those which are essential to ensure that prequalified tenderers are capable of executing the contract.
- \* There shall be no discrimination against local or overseas contractors.

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14

06/05/2018

## Type of Prequalification

- \* There are two types of prequalification:
  - a) prequalifying only a limited number of contractors (say 3 or 4) i.e. those scoring the highest marks in the prequalification exercise; or
  - b) prequalifying all contractors who meet the qualification requirements.
- \* The Express of Interest may be asked from potential tenderers prior to the prequalification.

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15

06/05/2018

## Sample Prequalification Documents under Japanese ODA Loans, issued by JICA

- PART 1 Prequalification Procedures
  - Section I Instructions to Applicants
  - Section II Prequalification Data Sheet – General Information
  - Section III **Prequalification Criteria and Requirements**
  - Section IV Application Forms
  - Section V List of Eligible Countries of Japanese ODA Loans
- PART 2 Works Requirements
  - Section VI Scope of Works

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16

06/05/2018

## Note for Prequalification Documents Part 1 Section III

- In addition to JICA sample, the followings may be asked:
- 1 Eligibility - Ownership to be asked;
  - 2 Historical Contract Non-Performance - Conviction record to be asked;
  - 3 Financial Situation; and
  - 4 Experience - Resources  
Safety, Quality Assurance, Environmental Management and Status of PII Insurance to be asked.

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17

06/05/2018

## Instructions to Tenderers

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18

06/05/2018

## JICA Sample Tender Documents under Japanese ODA Loans

- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA Loans (October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements  
Specifications (October), Drawings, Bill of Quantities and Other Information
- \* Part 3 Conditions of Contract and Contract Forms (September)

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## Details of Sample Bidding Documents

- PART 1 Bidding Procedures
  - Section I Instructions to Bidders (ITB)
  - Section II Bid Data Sheet (BDS)
  - Section III Evaluation and Qualification Criteria
  - Section IV Bidding Forms
  - Section V List of Eligible Countries of Japanese ODA Loans
- PART 2 Works Requirements
  - Section VI Works Requirements
- PART 3 Conditions of Contract and Contract Forms
  - Section VII General Conditions (GC), FIDIC MDB version
  - Section VIII Particular conditions
  - Section IX Annex to the Particular Conditions – Contract Forms

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## Note for Instructions to Tenderers

In addition to JICA sample, the followings may be clarified:

- \* Tenderer to visit Site;
- \* Information available for Inspection; Utility Services  
Soil Information  
Traffic Information, etc.
- \* Method of Construction;
- \* Tender Programme;
- \* Safety, Quality and Environmental Management; and
- \* Alternative Tender.

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## Type of Contracts

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## FIDIC MDB version of Conditions of Contract

- \* Contract Types
  - 1 measurement or lump sum;
  - 2 with fluctuation or fixed; and
  - 3 the Employer's design or the Contractor's design.
- \* Clause 4.1 Contractor's General Obligation  
 The Contractor shall design (to the extent specified in the Contract), execute and complete the Works in accordance with the Contract and with the Engineer's instructions, and shall remedy any defects in the Works.
- \* FIDIC MDB version Conditions of Contract could cover any type of contracts.

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## Priority of Documents

GCC Sub-Clause 1.5

- \* the Contract Agreement (if any),
- \* the Letter of Acceptance,
- \* the Letter of Tender,
- \* the Particular Conditions – Part A,
- \* **the Particular Conditions – Part B,**
- \* these General Conditions,
- \* the Specification,
- \* the Drawings, and
- \* the Schedules and any other documents forming part of the Contract.

} MDB Version

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### Particular Conditions Part B

- \* FIDIC MDB Version of Conditions of Contract could be tailor-made by the requirements and clarification described in Part B.
- \* Specific Provisions are intended to address country, project, and contract specific requirements not covered by General Conditions.
- \* Very careful consideration and/or legal advice is recommended when amending provisions or drafting new clauses.

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### FIDIC MDB Version for JICA Loan Projects under Japanese ODA

The contract under the Pink Book (FIDIC MDB Version) is a remeasurement contract with approximate Bill of Quantities.

The quantities in the Bill of Quantities are approximate only and are subject to remeasurement upon completion of works on site.

Items could be lump sum if the accurate quantities for the activities measured from the fully completed design in the pre-contract stage.

Lump sum items with drawings and specification are applicable to the electrical and mechanical works. However, measurement is required to assist in valuation of the variations.

JICA Advisor (TECI) 26 06/05/2018

### Bill of Quantities

JICA Advisor (TECI) 27 06/05/2018

### Definition of Bill of Quantities

- \* The term Bill(s) of Quantities is defined in **the method of measurement** as a list of items giving brief identifying descriptions and estimated quantities of the works to be performed.
- \* Quantity is simple but one of the biggest risk not only for the Contractor but also for the Employer.
- \* BOQ (BQ) forms a part of the contract documents and is the basis of payment to the Contractor.

JICA Advisor (TECI) 28 06/05/2018

### Method of Measurement

How to measure excavation or filling volume?  
measure actual volume?  
or theoretical volume?

How to measure reinforcement bar?  
measure lap length?  
or ignore lapping?

How to measure piling length?  
measure actual length?  
or bored length?

JICA Advisor (TECI) 29 06/05/2018

### Objectives of Bill of Quantities

The BOQ should be prepared correctly.

The following four main objectives of the document should always be kept in mind during preparation of BOQ.

- to enable tenders to be obtained from tenderers;
- to form the basis for tender comparison;
- to provide means of valuing the works; and
- to form a basis for fixing any rates not included in the BOQ or valuing any variations.

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## Preambles for Bill of Quantities

- \* **General Preambles**  
They provide the tenderers with the information needed for pricing the bill items and must be included in the contract documents.
- \* **Particular Preambles**  
They provide details of any amendments to the method of measurement to meet specific needs of the Contract.  
(For example)  
The item of the Bills of Quantities are not to be remeasured for payment unless those items marked with “\*” which will be remeasured.

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## Sample Preamble (1/2)

1	This is a lump sum fixed price contract.
2	The Drawings show the design intent of the Works. The Drawings will be deemed to have been the basis of the lump sum fixed price.
3	The Contractor is required to allow within his prices and sums for the development and full coordination of the Specification and the Drawings into the Works to enable the Works to be carried out on the Site.
4	The Contractor's attention is specifically drawn to the requirements of the continuous operation of the existing pumping station during the Works.
5	The Contractor's attention is drawn to the requirements for the responsibility of completing the Works as required by the Contract.
6	The quantities in the pricing documents are computed from the Drawings, but they are not guaranteed nor remeasured. The Contractor will be deemed to have reviewed and determined for himself the extent of the Works consisting of removal of the existing facilities and installation of the new facilities from the Specification and the Drawings.

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## Sample Preamble (2/2)

7	The Drawings do not show the extent of any additional service runs and fittings required to the rehabilitation works. These additional service runs or fittings and the development and coordination of the Works are to be allowed for by the Contractor in his prices and sums.
8	Adjustment item may be a lump sum addition or deduction in the Grand Summary in adjustment of the total of the priced parts Summaries.
9	The price and sums for items are to include providing and installing concrete thrust blocks, anchor blocks and the like, as necessary.
10	Testing and any commissioning shall include the cost of all necessary power, fuel and consumables, the provision of all instruments and the provision of all things necessary to carry out the testing and commissioning, as described, including the preparation of test certificates and the witnessing of the testing and commissioning by the Engineer.

JICA Advisor (TEC) 33 06/05/2018

## Prime Cost Items

The estimated price of work to be carried out by a Nominated Sub-Contractor shall be given in the BOQ as a Prime Cost Item

- \* Contractor's General Attendance (could be included)
- \* Contractor's Special Attendance (could be included)
- \* Contractor's profit and overheads

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## Provisional Sums and Other Items

- \* A Provisional Sum means a sum provided for works or expenditure which has not been quantified or detailed at the time of tender documents are issued, which sum may include provision for works to be executed or for materials or services to be supplied by a Nominated Sub-Contractor.
- \* Daywork (could be one of the method to reserve budget)
- \* Adjustment Item (to be proposed by the Tenderers)
- \* Contingency (around 3% is suggested)

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## Grand Summary of BOQ

1	Bill No 1 Preliminaries
2	Bill No 2 Construction/Structures
3	Bill No n Construction/Structures
4	Bill No X Prime Cost (by Nominated Sub-Contractors)
5	Bill No Y Provisional Sums
6	Bill No Z Daywork
	Total
7	Adjustment Item
8	Contingency
	Grand Total (Tender Price)

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### Bill No 1 Preliminaries

BILL NO. 1 PRELIMINARIES AND GENERALS					
Item Code	Item Description	Unit	Quantity	Rate JPY	Amount JPY
<b>GENERAL ITEMS</b>					
<b>CONTRACTUAL REQUIREMENTS</b>					
020110	Performance Security	sum			
020110	Advance Payment Guarantee	sum			
<b>Contractor's Insurances</b>					
020130	Contractor's All Risks Insurance for the Works	sum			
020130	Third Party Insurance against injury to persons and damage to properties	sum			
020130	Employers' Compensation Insurance for Contractor's personnel	sum			
020130	Professional Indemnity Insurance	sum			
020130	Contractor's Equipment Insurance	sum			

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### Bill No 2 ~ n Construction/Structures

BILL NO. 2 GENERAL CIVIL WORKS					
Item Code	Item Description	Unit	Quantity	Rate JPY	Amount JPY
<b>GENERAL CIVIL WORKS</b>					
<b>SEWAGE TREATMENT PLANT (STP) SITE</b>					
<b>SITE CLEARANCE</b>					
150210	Works Areas for the Sewage Treatment Plant Site	sum			
<b>TEMPORARY WORKS</b>					
<b>Temporary Access Roads</b>					
100210	Access road A from Tama Municipality toward Kasahara Community to the Sewage Treatment Plant Site including provisions of existing stream crossings in Works Area A	sum			
100210	Alternative access road B from Route 28 Nemori at Mt. Aoi to the Sewage Treatment Plant Site including provisions of existing stream crossings in Works Area B, if necessary	sum			
<b>Temporary Roads within the STP Site</b>					
100220	Temporary roads with hard-core materials including temporary stream crossings within the Sewage Treatment Plant Site	sum			
<b>Temporary Diversion of Streams</b>					
100230	Stream in the vicinity of the Sewage Treatment Plant Site	sum			

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### Temporary Works

TEMPORARY WORKS					
Item Code	Item Description	Unit	Quantity	Rate JPY	Amount JPY
100310	Temporary cofferdam with support system	sum			0.00
100330	Other Temporary Works required for the Contractor's proposed construction method including their removal from the Site on Completion	sum			0.00
<b>EARTHWORK</b>					
<b>Excavation for Structure</b>					
200311	Excavate materials other than top soil or artificial hard materials and/or fill to the formation levels including preparation for blinding and deposit surplus materials to Works Area STP-3	m3	17,864	0.00	0.00
<b>Filling</b>					
200331	Suitable materials from Works Area STP-3	m3	5,997	0.00	0.00
200331	Gravel (0 - 75mm) to receive blinding concrete	m3	1,084	0.00	0.00

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### Formwork

FORM WORK					
Item Code	Item Description	Unit	Quantity	Rate JPY	Amount JPY
Plywood Finish including box out up to 500 x 500mm, construction joints, propping, support, scaffolding and the like					
400311	Base slab	m2	225		
400311	Slabs and beams other than base slab	m2	2,789		
400311	Columns	m2	907		
400311	Walls	m2	7,829		
400311	Stairs	m2	162		

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### Reinforcement Bars

REINFORCEMENT WORK					
Item Code	Item Description	Unit	Quantity	Rate JPY	Amount JPY
Supply, fabricate and install deformed high yield steel bars to DIN 488					
450311*	Nominal size 8mm	kg	469		
450311*	Nominal size 10mm	kg	35,306		
450311*	Nominal size 12mm	kg	810		
450311*	Nominal size 14mm	kg	6,413		
450311*	Nominal size 16mm	kg	2,506		
450311*	Nominal size 20mm	kg	148,234		
450311*	Nominal size 25mm	kg	511,713		

JICA Advisor (TEC) 41 06/05/2018

### Concrete

CONCRETE WORK					
Item Code	Item Description	Unit	Quantity	Rate JPY	Amount JPY
<b>Provision of Concrete</b>					
300611	Class C 16/20	m3	159		
300611	Class C 30/37	m3	1,295		
<b>Placing of Concrete</b>					
Placing, finishing with trowel and curing of concrete including scabbling to construction joints					
300621	Blinding layer (Class C 16/20) including stop end forms	m3	159		
300621	Slabs and beams (Class C 30/37)	m3	1,004		
300621	Walls (Class C 30/37)	m3	289		
300621	Stairs (Class C 30/37)	m3	2		

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### Pipe Works

PIPE WORKS IN SEWAGE TREATMENT PLANT			
Design, supply, fabricate and install pipes including embedding in accordance with requirements of the Specification and the Drawings			
SEWAGE PIPE WORKS BETWEEN FACILITIES			
Sewage Pipes from Suction Chamber of Lift Pumps to Main Distribution Tank			
701911	Ductile Iron Pipe - DN 400mm	m	15
701911	Ductile Iron Pipe - DN 500mm	m	21
701911	Ductile Iron Pipe - DN 1200mm	m	58
701911	Ductile Iron Pipe - DN 1800mm	m	1
701921	Flexible Joint - DN 1200mm, Shear Deflection 100mm	nr	2

### Microtunnelling

TRUNK SEWER & MAIN SEWER			
Supply and install sewer pipes by microtunnelling technique with the Contractor's proposed temporary works, including traffic diversion, decking and pedestrian bridges and the like, which shall be removed from the Site on Completion and reinstated to the original conditions and to the acceptance of the Relevant Authorities			
MICROTUNNELLING MACHINES			
Deliver and operate microtunnelling machines to install sewers in accordance with the construction programme including intermediate jacking system, as necessary, maintenance, spare parts and insurance and removal from the Site on completion.			

### Design and Build Item

752630	Design, supply and install the New South Interceptor from overflow structure L-07 in the vicinity of the Bilet School to Shaft #12 in Area S07 along the Southern part of Bakayardi Bagram Curri for about 2,990m by microtunnelling technique including launching shafts and arrival shafts, connections of the existing 16 numbers of sewer pipes and culverts by overflow structures and manholes, a connection of the Existing South Interceptor, which collects the rest of sewage and stormwater flow from the area located South of the ESK, an overflow structure that discharges the dry weather flow to Shaft #12 and the excess flow to Lama River including the connection to shaft #12 and the outlet structure to Lama River with the Contractor's proposed temporary works, such as cofferdam, sheet piling, trial excavation, utility sounding, traffic diversion, decking and pedestrian bridges and the like, which shall be removed from the Site on Completion and reinstated to the original conditions and to the acceptance of the Relevant Authorities.	sum				0.00
The design shall be subject to the Approval of the Engineer shall comply in all aspects with the Employer's Requirements of the New South Interceptor contained in the Specification and the Drawings.						

### Mechanical Works

Bill No. 70 MECHANICAL WORKS							
Item Code	Item Description	Unit	Quantity	Rate	JPY	Amount	JPY
PLANT INSTALLATION							
Design, manufacture, supply and install mechanical works in accordance with requirements of the Specification and the Drawings.							
GRIT CHAMBER AND PUMPSTATION							
Plant for Grit Chamber							
902011	Inlet gate	nr	2				
902021	Coarse screen	nr	2				
902021	Fine screen	nr	2				
902041	Screening conveyor (1)	nr	1				

### Electrical Works

Bill No. 21 ELECTRICAL WORKS							
Item Code	Item Description	Unit	Quantity	Rate	JPY	Amount	JPY
ELECTRICAL INSTALLATION							
Design, manufacture, supply and install electrical works in accordance with requirements of the Specification and the Drawings							
35kVA SUBSTATION AND GENERATOR HOUSE							
35kV System							
952110	MV Line Arrival, AR-1 40(24)kV, 400A, 12.5kA	sum					
952110	MV Line Departure, AR-2 40(24)kV, 400A, 12.5kA	sum					

### Architectural Builder's Works and Finishes

ARCHITECTURAL BUILDER'S WORKS AND FINISHES (ABWF)			
Design, manufacture, supply and install ABWF works in accordance with requirements of the Specification and the Drawings			
Rendering			
602311	Horizontal surface	m2	1,477
Plastering			
602311	Internal walls (PL-1, t=20mm)	m2	1,598
602311	Perimeter walls (PL-2, t=20mm)	m2	449
602311	Perimeter walls (PL-3, t=35mm)	m2	91
Tiling			
602321	TL-01 (glazed porcelain tiles, class 3, 12 x 400 x 400mm)	m2	188



### Building Services

BUILDING SERVICES			
	Design, manufacture, supply and install Building Services works in accordance with requirements of the Specification and the Drawings		
652310	Mechanical works	sum	
652320	Electrical works	sum	
652330	Fire services	sum	
652340	Hydraulic works	sum	

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### Prime Cost – Nominated Sub-Contractor

PRIME COST, PROVISIONAL AND CONTINGENCY SUMS			
PRIME COST SUM FOR WORK TO BE CARRIED OUT BY NOMINATED SUB-CONTRACTORS			
Building Services Installations			
Allow the Prime Cost Sum of HK\$ 7,500,000.00 for			
A	electrical, fire service, towngas and air conditioning and mechanical ventilation installations		7,500,000.00
Add for profit			
B		%	
Allow for attendance as detailed in Bill Nr. 1 and for cutting away for and making good in all trades after the installation of the following:-			

JICA Advisor (TEC) 50 06/05/2018

### Provisional Sums

BILL No. 30A PROVISIONAL SUMS			
Provide the following Provisional Sums to be expended in whole or in part or omitted if total amount required upon written instruction of the Engineer in accordance with Clause 13.5 and of the General Conditions of Contract.			
PROVISIONAL SUMS			
013010	Allow the Provisional Sum of JPY 26,000,000 for Utility Diversions by the Contractor	sum	26,000,000
013030	Allow the Provisional Sum of JPY 3,000,000 for furnitures in the Administration Building and other buildings in the Sewage Treatment Plant	sum	3,000,000
013040	Allow the Provisional Sum of JPY 4,000,000 for equipments in the workshop and store room in the Sewage Treatment Plant	sum	4,000,000

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### Daywork (1/3)

BILL 30B DAYWORKS			
Daywork Rates shall be used for valuation of the Daywork instructed by the Engineer in accordance with Clause 13.6 of the General Conditions of Contract			
LABOUR			
Rates shall include on and off overhead of the Contractor, supervision, taxes, insurance, general allowance and the like during normal working hours including meal break and rest periods. Also rates shall include hand tools, ladders, trestles, protective clothing, safety equipment, use of existing services, temporary works and normal travelling time to and from the Site.			

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### Daywork (2/3)

PLANT			
Rates shall include on and off overhead of the Contractor, operator, supervision, taxes, insurance, general allowance and the like including standing time. Also rates shall include fuel, oil, consumable stores, repairs, maintenance and normal travelling time to and from the Site.			
MATERIALS			
Rates shall include on and off overhead of the Contractor, taxes, insurance, general allowance and the like including waste and surplus materials. Also rates shall include transportation, delivery, unloading, unpacking, storing and protecting.			

JICA Advisor (TEC) 53 06/05/2018

### Daywork (3/3)

013015	General Labour	h	10		
013015	Carpenter	h	10		
013015	Steel fixer	h	10		
013025	Hydraulic backhoe (0.8m <sup>3</sup> )	h	10		
013025	Compressor (7.5m <sup>3</sup> /min) with two breakers	h	10		
013025	Mobile crane (20ton)	h	10		
013035	Concrete (30/37)	m <sup>3</sup>	1		
013035	Deformed reinforcement bars (10 - 20mm)	t	1		
013035	Plywood (18 x 1200 x 2400)	nr	1		


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### Contingency Sum

CONTINGENCY SUM		
Provide the following sums to be expended wholly or in part as directed by the Architect or wholly deducted from the Contract Sum if not required		
Allow a Contingency Sum for		
A	General Contingencies	2,700,000/00
B	Contract Price Fluctuation	3,800,000/00

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### Question and Answer and Next Topics



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### Question and Answer

**Ever Forward, a Step by a Step**



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### The Contractor, The Engineer, YCDC, Subcontractors, JICA and all stakeholders

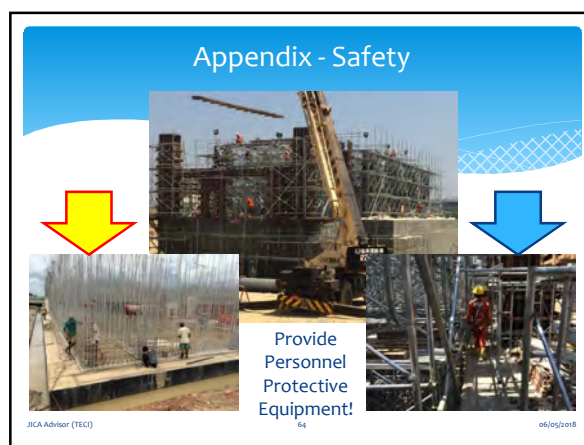
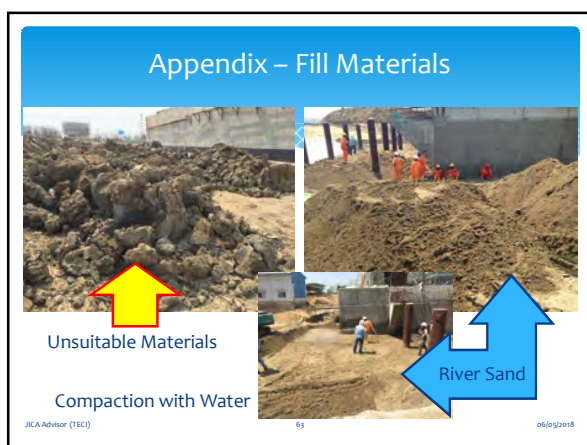
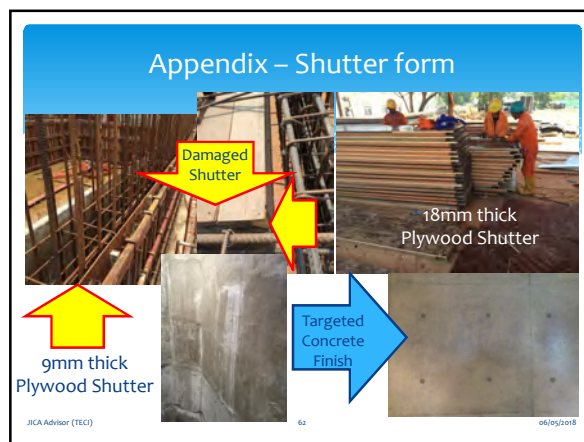
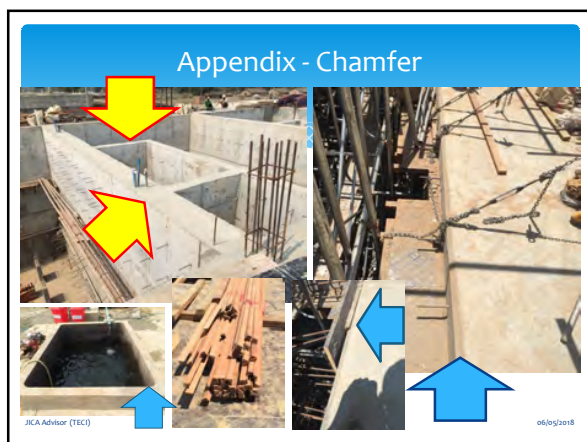


**Strive to win with Team Work !**

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- ### Back Numbers
- 1 Safety, Quality and Environmental (on Site)
  - 2 & 3 Workmanship (on Site)
  - 4 & 5 Construction Details (on Site)
  - 6 Site Management (on Site)
  - 7 Meetings and Reports (on Site)
  - 8 Conditions of Contract (at HO)
  - 9 Specifications (at HO)
  - 10 Project Management (at HO)
  - 11 Programme and Water Retaining Structures (at HO)
- JICA Advisor (TEC) 59 06/05/2018

- ### Subject of Seminar and JICA Sample Tender Documents
- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA Loans (October 2012 version 1.0, JICA) (March)
  - \* Part 2 Works Requirements  
Specifications (October), Drawings, Bill of Quantities (March) and Other Information
  - \* Part 3 Conditions of Contract and Contract Forms (September)
  - \* Project Management including Safety (November)
  - \* Programme and Water Retaining Structures (January)
  - \* PQ Document and Instruction to Tenderers (March)
  - \* Construction Supervision and Contracts Administration
- JICA Advisor (TEC) 60 06/05/2018

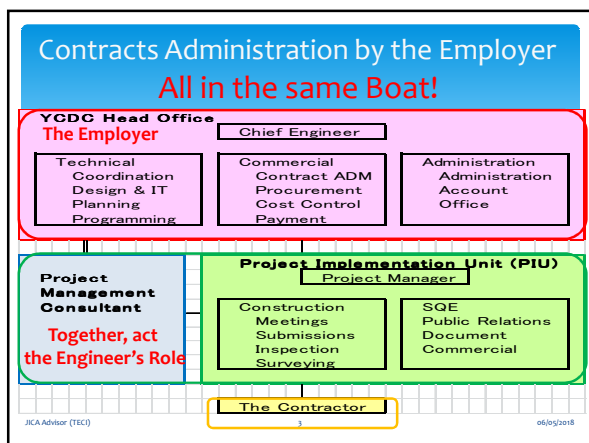


YCDC colleagues are welcome  
to  
the Project Management Seminar

JICA assisted Capacity Development on  
Lagunbyin Water Treatment Plant under  
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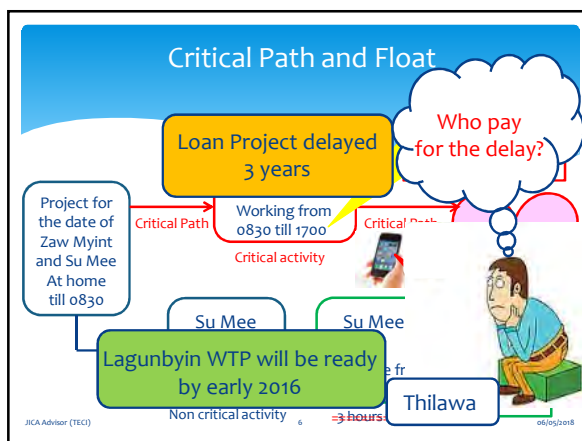
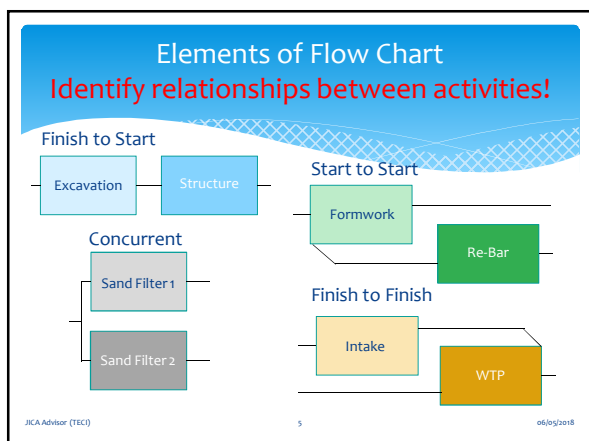
Drawings, Other Information,  
Construction Supervision and  
Contract Administration

Seminar No 13, 27 May 2015  
JICA Advisors for Monitoring of LWTP Construction



Review of Previous Seminars

JICA Advisor (TEC) 06/05/2018



### FIDIC MDB version of Conditions of Contract

**Risk Demarcation depends on the type of Contract**

Risk	Type of Contract
1 Quantity	1 measurement or lump sum
2 Inflation or Exchange	2 with fluctuation or fixed
3 Design Responsibility	3 the Employer's design or the Contractor's design.

Requirements	Conditions
1 Performance	1 Fitness of Purpose
2 Programme	2 Liquidated Damages

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### Type of Prequalification

\* There are two types of prequalification:-

- prequalifying only a limited number of contractors (say 3 or 4) i.e. those scoring the highest marks in the prequalification exercise; or
- prequalifying all contractors who meet the qualification requirements. (JICA Guideline)

**Good Contractor from Good Requirements in PQ**

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### Method of Measurement

**Establish Measurement Standard**

Excavation Volume: How to measure excavation or filling volume? measure actual volume? or theoretical volume?

Re Bar: How to measure reinforcement bar? measure lap length? or ignore lapping?

Pile Head: How to measure piling length? measure actual length? or bored length?

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### Lessons learned from the Site

Temporary Works, such as access road, working platform, formwork and **safety** measures are key activities for good progress and quality products!

**Permanent Works are depending on the quality of Temporary Works!!**

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### Are you ready for JICA Loan Projects?

Do you have questions about the FIDIC type contracts or construction details?

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### Subject of Today

- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA Loans (October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements  
Specifications (October), Drawings, Bill of Quantities and Other Information
- \* Part 3 Conditions of Contract and Contract Forms (September)
- \* Project Management including Safety (November)
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- \* PQ Document and Instructions to Tenderers
- \* **Construction Supervision and Contract Administration**

JICA Advisor (TEC) 12 06/05/2018



## Contents

- \* Drawings
- \* Other Information
- \* Construction Supervision
- \* Contract Administration
- \* Questions and Answers

JICA Advisor (TEC) 13 06/05/2018

## Drawings

JICA Advisor (TEC) 14 06/05/2018

## Drawings for Construction (A-0 and A-3 sizes)

- 1 List of Drawings, General Notes and Legends
- 2 Location Plan and General Layout Plan
- 3 General Arrangement for Structures
- 4 Reinforcement Bar Arrangement
- 5 Architectural Building Works and Finishes (ABWF)
- 6 Building Services (Mechanical, Electrical, Hydraulic and Fire Services)
- 7 Pipe Work
- 8 Earth Work and Foundation Works
- 9 Road Works, Landscape and Miscellaneous Works
- 10 Process Flow Diagram and Mechanical Work
- 11 Single Line Diagram and Electrical Work

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## Drawing List

DRAWING NO.	REV.	TITLE
1108/T044A/HK/C010041	B	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) Civil & Structural Drawing List
1108/T044A/HK/C01141	B	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) General Notes
1108/T044A/HK/C01241	B	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) Location Plan
1108/T044A/HK/C02041	B	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) General Layout Plan
1108/T044A/HK/C10041	A	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) Loading Key Plan
1108/T044A/HK/C10141	B	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) Framing Plans Sheet 1 of 4
1108/T044A/HK/C101142	A	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) Framing Plans Sheet 2 of 4
1108/T044A/HK/C101143	A	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) Framing Plans Sheet 3 of 4
1108/T044A/HK/C101144	B	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) Framing Plans Sheet 4 of 4
1108/T044A/HK/C10041	B	Contract 1108 Kai Tak Station and Associated Tunnels Emergency Egress Point (SUA) Outline of Emergency Egress Point/Sheet 1 of 1

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## General Notes

JICA Advisor (TEC) 17 06/05/2018

## General Notes (General)

**GENERAL NOTES :**

01. THESE NOTES ARE FOR GENERAL INFORMATION ONLY. FOR ANY PARTICULAR REQUIREMENTS, REFER TO INDIVIDUAL DRAWINGS.
02. ALL MATERIAL AND WORKMANSHIP REQUIREMENTS SHALL BE READ IN CONJUNCTION WITH THE MM SPECIFICATIONS.
03. THE STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ARCHITECTURAL, EAM AND OTHER RELEVANT DRAWINGS.
04. NO DIMENSIONS SHALL BE OBTAINED FROM SCALING DRAWINGS.
05. STRUCTURAL LEVELS ARE 3M METRES ABOVE HONG KONG PRINCIPAL DATUM (HPD), AND ARE GIVEN TO THE TOP OF STRUCTURAL CONCRETE UNLESS NOTED OTHERWISE.
06. ALL DIMENSION ARE IN mm UNLESS OTHERWISE STATED.
07. CONSTRUCTION STANDARDS AND TECHNICAL ACCEPTANCE CRITERIA SHALL BE IN COMPLIANCE WITH THE PERFORMANCE REQUIREMENTS AS SET OUT IN THE BUILDING (CONSTRUCTION) REGULATIONS AND ALLIED CODE OF PRACTICES OR MM SPECIFICATIONS WHATEVER IT IS MORE STRINGENT UNLESS OTHERWISE STATED.

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### General Notes (Concrete)

**CONCRETE :**

C1. STRUCTURAL CONCRETE SHALL BE A "DESIGNED MIX" UNLESS NOTED OTHERWISE. THE DESIGNED CONCRETE SHALL BE IN ACCORDANCE WITH MIX SPECIFICATION FOR CIVIL ENGINEERING WORKS VOLUMES 1 TO 3.

STRUCTURAL ELEMENT	CONCRETE DESIGN MIX
ALL ELEMENTS UNLESS NOTED OTHERWISE	40D/20
MASS CONCRETE	20D/20
BLINDING	20D/20

C2. ALL FORMWORK AND PROPPING UNDER SUSPENDED CONCRETE WORKS SHALL BE REMOVED BEFORE MASONRY WORK IS BUILT ABOVE.

C3. THE REQUIREMENTS FOR DIFFERENT PARTS OF THE WORKS TO INCORPORATE POLYPROPYLENE FIBRES IN ACCORDANCE WITH THE MIX SPECIFICATION ARE AS FOLLOWS:

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### General Notes (Reinforcement Bar)

RT. NOTATION OF BAR REINFORCEMENT IS AS FOLLOWS :

5 T 16 - 01 - 200 T1

NO. OF BARS  
TYPE OF BAR  
BAR DIAMETER IN mm

BAR POSITION  
BAR SPACING IN mm  
BAR MARK

SUFFIX T1 = TOP (1ST LAYER)  
B1 = BOTTOM (1ST LAYER)  
NF = NEAR FACE  
FF = FAR FACE  
EF = EACH FACE  
RL = RANDOM LAP  
V = VARIES  
ABR = ALTERNATE BAR REVERSED  
ABS = ALTERNATE BAR STAGGERED  
AP = ALTERNATE PLACED  
L = LAP / ANCHORAGE  
SS = SINGLE STIRRUP  
DS = DOUBLE STIRRUP  
TS = TRIPLE STIRRUP

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### General Notes (Abbreviations)

**GENERAL ABBREVIATIONS**

MM.	- MILLIMETRE
MPa	- MEGAPASCAL
NTS	- NOT TO SCALE
UNO	- UNLESS NOTED OTHERWISE
SFL	- STRUCTURAL FLOOR LEVEL
SSL	- STRUCTURAL SLAB LEVEL
PFL	- FINISHED FLOOR LEVEL
SOP	- SETTING OUT POINT
FGL	- FINISHED GROUND LEVEL
FL	- FINISHED LEVEL
NSOE	- NOT SHOWN ON ELEVATION
NSOP	- NOT SHOWN ON PLAN
TAL	- TENSION ANCHORAGE LENGTH
TLL	- TENSION LAP LENGTH
THR.	- THICK
TYP.	- TYPICAL
UB	- UNIVERSAL BEAM
UPP	- UNIVERSAL BEARING PILE
UC	- UNIVERSAL COLUMN

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### General Notes (Legend)

**LEGEND**

L1. STRUCTURAL LEVELS SHOWN THUS ON PLAN : -		+2,000 SFL
L2. EXISTING LEVELS SHOWN THUS ON PLAN : -		+2,000
L3. FINISHED LEVELS SHOWN THUS ON PLAN : -		+2,000 FFL
L4. STRUCTURAL LEVELS SHOWN THUS ON ELEVATION AND SECTION : -		+2,000 SFL
L5. FINISHED LEVELS SHOWN THUS ON ELEVATION AND SECTION : -		+2,000 FFL
L6. COLUMN SHOWN THUS ON PLAN : - (B x D)		500 x 750 (WIDTH) (OVERALL DEPTH FROM TOP OF SLAB)
L7. DOWNSTAND BEAMS INDICATED ON PLAN THUS : -		

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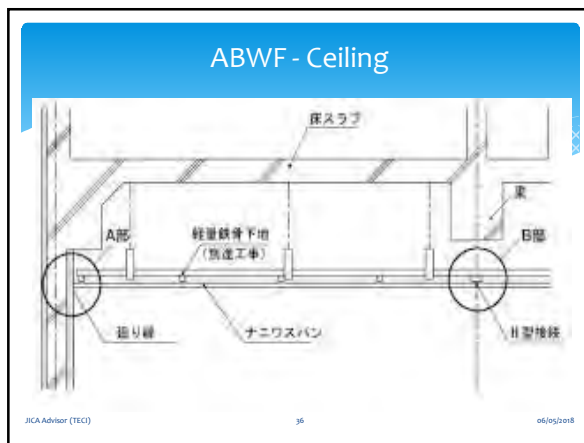
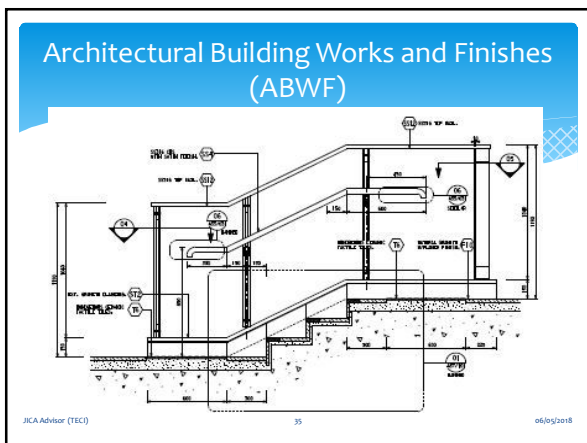
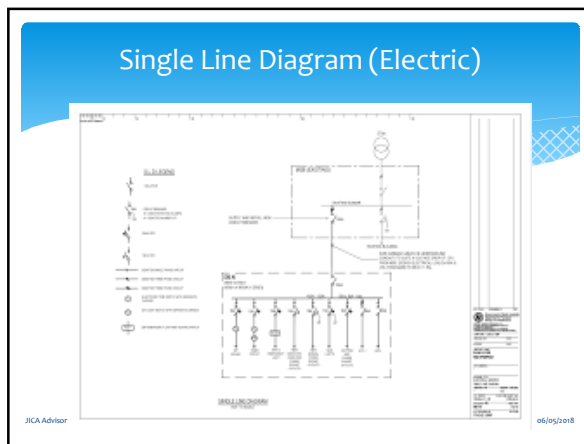
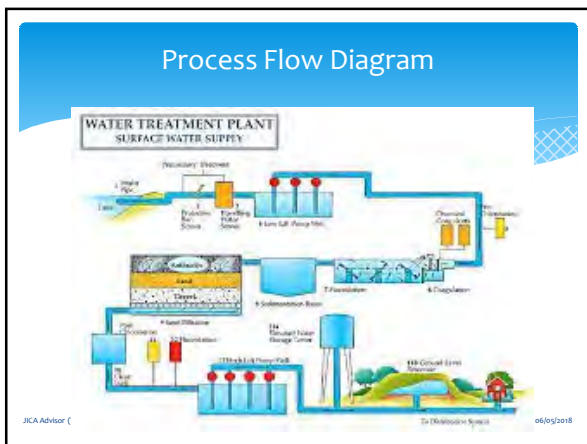
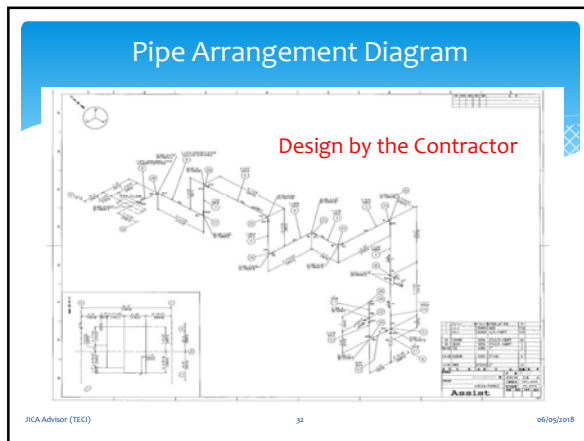
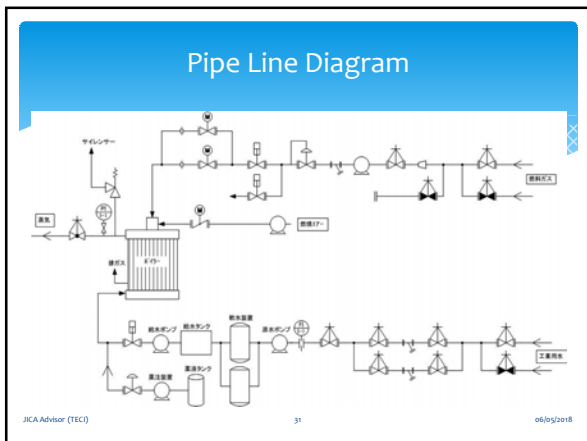
### Location Plan and Key Plan

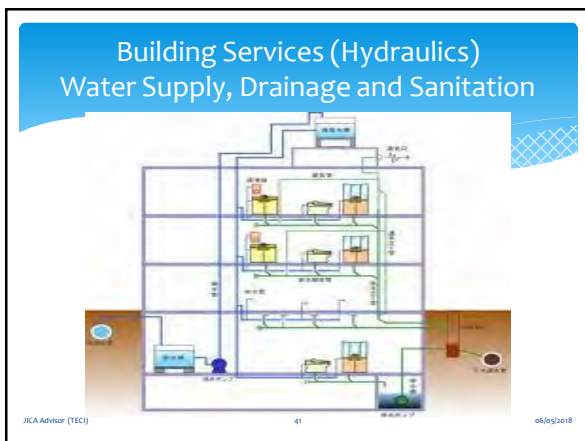
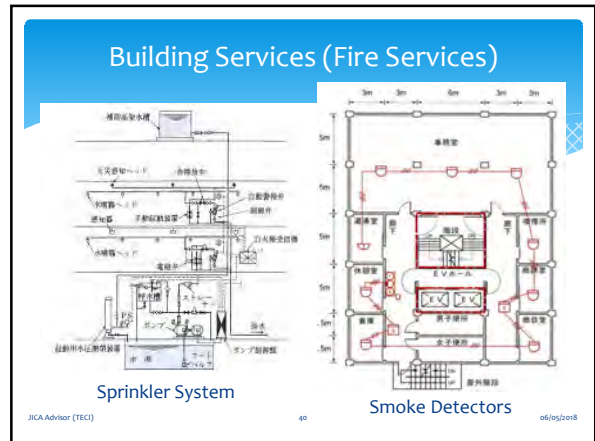
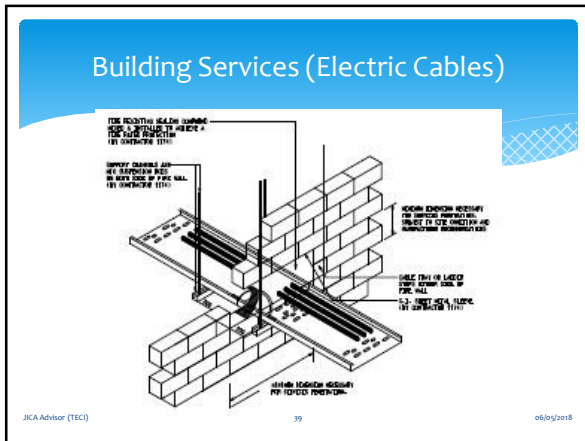
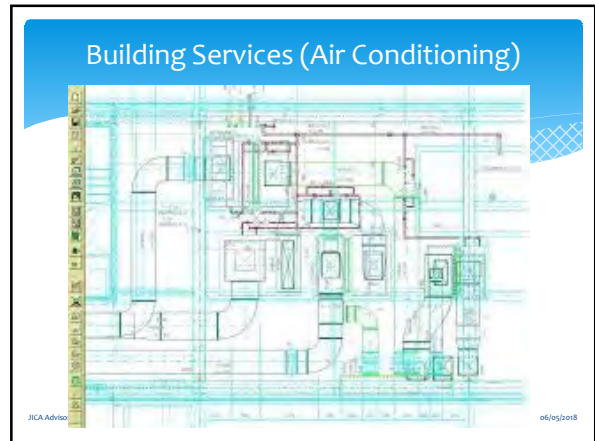
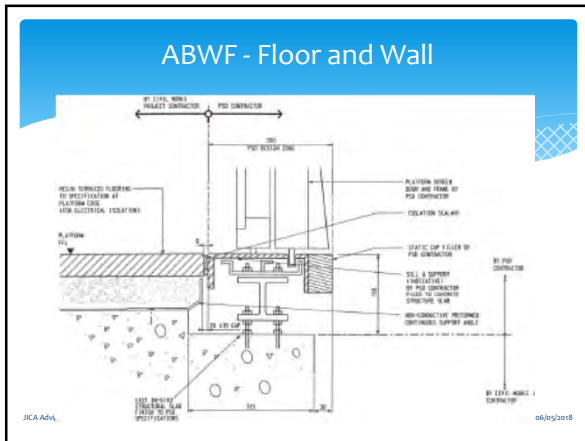
JICA Advisor (TEC) 23 06/05/2018

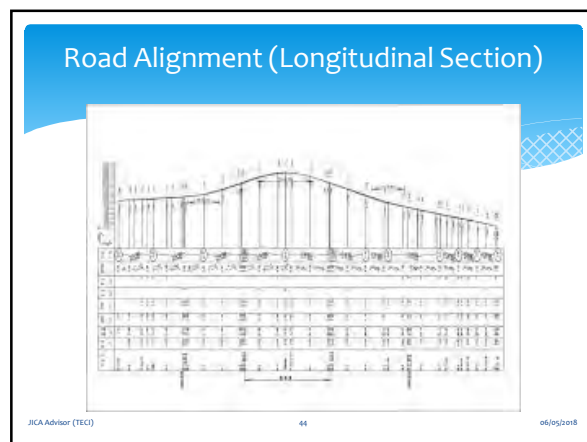
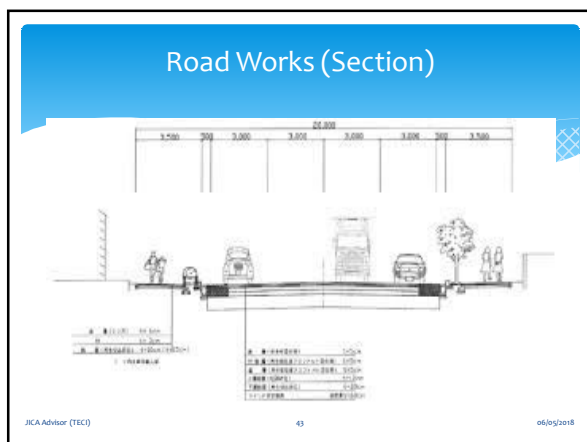
### Earth Work (Plan)

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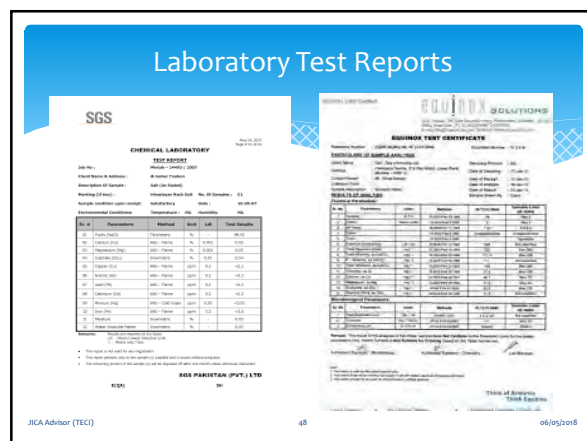
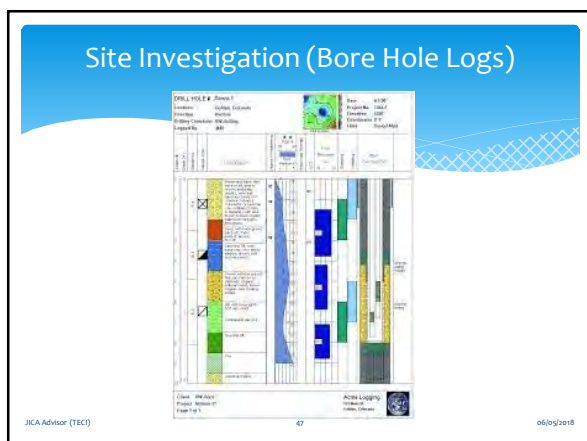




### Other Information

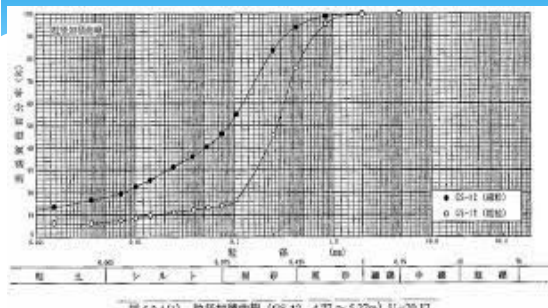
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- ### Information available at Tender
- 1 Essential information should be included in the tender document.
  - 2 Reference information could be available for inspection.
    - \* Site Investigation Report
    - \* Laboratory Tests Report
    - \* Utility Information
    - \* Foundation Information
    - \* As-built Information
    - \* Any Other Information related to the project
- JICA Advisor (TEC) 46 06/05/2018





### Laboratory Test Reports (Sieve analysis)



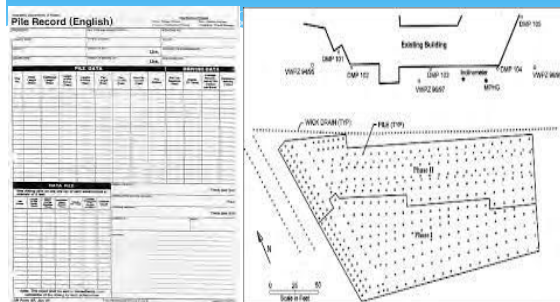
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### Utility Information



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### Foundation Information



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### AS-Built Information



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### Any Other Information Related to the Project

- \* Any Project related Reports
- \* Reports of Neighbour Sites
- \* etc.

These information are not necessary to include in the tender document, but may be available for inspection upon tenderers requests.

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### Construction Supervision

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### Construction Supervision Manual (CSM)

CSM provides references and guidelines of the site management. The CSM includes the following items:-

- Project implementation and organisation interfaces;
- General duties and responsibilities of the Engineer;
- Job description of the Engineer's staff; and
- Specific Duties, Roles and Responsibilities of the Contractor, the Engineer and the Employer.

**CSM specify when, who does what and how to do it.**

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### Specific Task of the Engineer's Staff (YCDC Site Staff)

Supervise, Monitor, Review, Test and Report:

- \* Safety (Safety Manual)
- \* Workmanship (Drawings and Specifications)
- \* Materials (Specifications and Method Statement)
- \* Labours (Trade and Numbers)
- \* Plant and Equipment (Method Statement)
- \* Planning and Programme (Works Programme)
- \* Environmental Issues (Site and Office)
- \* Payments (Assess Progress and Bill of Quantities)

To the Engineer (YCDC Head Office).

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### The Engineer's Staff to convene Meetings

- \* Daily Meeting on Site attended by the site staff:  
Review daily activities and forecast tomorrow
- \* Weekly Meeting attended by production engineers:  
Review design, method, progress and programme and forecast the following week
- \* Monthly Meeting attended by the management:  
Review technical and commercial status of the project
- \* Steering Committee Meeting by the senior management  
Decide policy of the project

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### Contract Administration

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### Tender Proposal is the Base Line of the Contractor's Intention

The Tender Proposal:

- 1 Construction Method
- 2 Tender Programme
- 3 Tender Price

Accepted



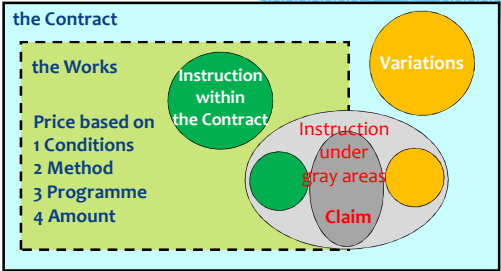
The Contract Execution:

- 1 Each Method Statement (Sequence, Materials, Plant etc.)
- 2 Works Programme
- 3 Contract Price

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### Risk and Problems after Honeymoon period passed

Society/Law



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### Extension of Time and Price Adjustment in FIDIC Contract (MDB, 1/2)

- \* 1.9 Delayed Drawings or Instructions (the Engineer)
- \* 2.1 Right of Access to the Site (the Employer)
- \* 4.7 Setting Out (the Employer)
- \* 4.12 Unforeseeable Physical Conditions
- \* 4.24 Fossils
- \* 7.4 Testing (the Engineer or the Employer)
- \* 8.4 **Extension of Time for Completion (causes a to e)**
- \* 8.5 Delays Caused by Authorities
- \* 8.9 Consequences of Suspension
- \* 10.2 Taking Over of Parts of the Works (the Employer)
- \* 10.3 Interference with Tests on Completion (the Employer)

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### Extension of Time and Price Adjustment in FIDIC Contract (MDB, 2/2)

- \* 11.8 Contractor to Search (the Engineer)
- \* 12.4 Omissions (the Employer)
- \* 13 **Variations and Adjustment**
- \* 13.1 Right to Vary (the Engineer or the Employer)
- \* 13.5 Provisional Sums (the Engineer or the Employer)
- \* 13.6 Daywork (the Engineer)
- \* 13.7 Adjustments for Changes in Legislation
- \* 16.1 Contractor's Entitlement to Suspend Work (the Employer)
- \* 17.4 Consequences of Employer's Risk (the Employer)
- \* 19.4 Consequences of Force Majeure

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### Conflict of Interest between the Employer and the Contractor

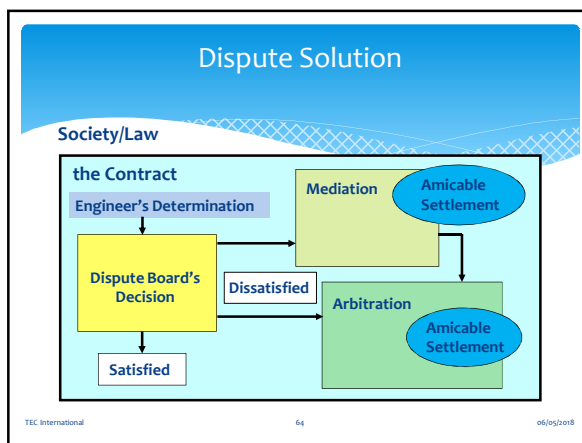
Target is a successful completion of the project.  
All stakeholders are in the same boat.



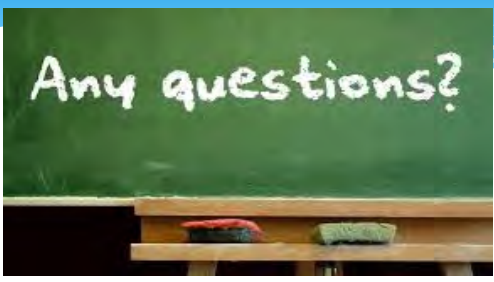
**But**

The Employer **to pay** vs The Contractor **to be paid**

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### Questions and Answers



**Ever Forward, a Step by a Step**

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### The Contractor, The Engineer, YCDC, Subcontractors, JICA and all Stakeholders



**Strive to win with Team Work !**

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### Back Numbers

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### JICA Sample Tender Documents

- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA Loans  
(October 2012 version 1.0, JICA) (March)
- \* Part 2 Works Requirements  
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- \* Programme and Water Retaining Structures (January)
- \* PQ Document and Instruction to Tenderers (March)
- \* Construction Supervision and Contract Administration (May)

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### The Summary of the Seminar in July

**Project Management**

- 1 Safety and Workmanship
- 2 Method and Sequence of Construction
- 3 Planning and Programme
- 4 Progress Monitoring and Report
- 5 Contract Document
- 6 Budget and Cost Control

JICA Advisor (TEC) 69 06/05/2018

ကျေးဇူးတင်ပါတယ်

**Arigatou gozaimashita**

**Thank You**

JICA Advisor (TEC) 70 06/05/2018

JICA assisted Capacity Development on  
Lagunbyin Water Treatment Plant under  
Greater Yangon Water Supply Improvement Project  
implemented by YCDC

Summary of the Seminar  
“Project Management”

Seminar No 14, 10 July 2015  
JICA Advisors for Monitoring of LWTP Construction

Engineer’s Business  
always starts from **Safety**



JICA Advisor (TEC) 2 06/05/2018

Summary of the Seminar

- Safety, Quality and Environment
- Workmanship
- Planning and Programming
- Progress Monitoring and Report
- Contracts Document
- Budget and Cost Control
- Project Management under FIDIC Contracts

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Prologue

JICA Advisor (TEC) 4 06/05/2018

Saw

Japanese Saw



**Pull to cut!**

Saw in Myanmar



**Push to cut**

JICA Advisor (TEC) 5 06/05/2018

Plane

Japanese Plane



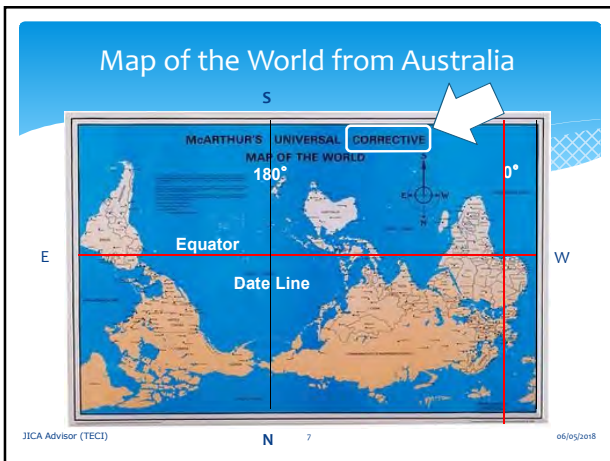
**Pull to plane**

How about Myanmar?



**Push to plane?**

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### Safety, Quality and Environment

**International Standards**

- \* OHSAS 18001  
Occupational Health and Safety Assessment Series  
➡ "Safety Plan"
- \* ISO 9001  
Quality Assurance  
➡ "Quality Assurance Manual"
- \* ISO 14001  
Environmental Management System (EMS)  
➡ "Environmental Management Plan"

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### Unsafe Cabling on Site must be improved NOW!

Domestic Plugs

Cabling

Good Arrangement But Bad practice

Direct Connection

Switch Board

Power Supply

JICA Advisor (TEC) 14 06/05/2018

### Quality Management

**Components**  
 Quality Planning  
 Quality Control  
 Quality Assurance  
 Quality Improvement

**Principle**

1. Leadership
2. Customer Focus
3. Process Approach
4. Involvement of People
5. Continual Improvement
6. System approach to Management
7. Factual approach to Decision Making
8. Mutual Beneficial Supplier Relationships

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### Quality Control and Quality Assurance

**Quality Control:**  
 The observation techniques and activities used to fulfill requirements for quality.

**Quality Assurance:**  
 The planned and systematic activities implemented in a quality system so that quality requirements for services will be fulfilled.

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### Document Control (Base of Quality Assurance)

- \* Correspondences including Meeting Minutes (Notes)
  - Master Files (going out and incoming in sequential order)
  - General Files (subject by subject)
  - Working Files (particular topics)
- \* Programme and Method Statement
- \* Material Submissions (including samples)
- \* Tests and Inspection Sheets (including survey reports)
- \* Measurement Sheets (including bending schedules)
- \* Drawings and their revisions (A0 and A3 sizes)

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### Site Conditions during Piling Work

Kappa – Japanese Fairy Tale

JICA Advisor (TEC) 17 06/05/2018

### Rainy Season at Site

I am worry about my health and environment around here....

**Kappa in Lagunbyin**

JICA Advisor (TEC) 18 06/05/2018



### Environmental Protection (Waste Treatment)



**Before** **After**

JICA Advisor (TEC) 19 06/05/2018

This slide illustrates waste treatment. The 'Before' image shows a cluttered area with numerous white plastic bags and debris. The 'After' image shows the same area cleaned up, with three blue recycling bins neatly arranged on a metal stand.

### Environmental Protection (Air Pollution)



**Cement Storage at the Batching Plant**

JICA Advisor (TEC) 20 06/05/2018

The image shows a large industrial facility, identified as a batching plant, with a significant amount of dust or steam rising from the area, illustrating air pollution.

### Environmental Protection (Water Pollution)

Ngamoeyeik Creek in Town




Ngamoeyeik Creek at Intake for Lagunbyin WTP

JICA Advisor (TEC) 21 06/05/2018

This slide shows water pollution. The left image shows a creek flowing through a town with buildings and boats. The right image shows the creek at an intake for the Lagunbyin WTP, with a large amount of debris and trash floating in the water.

### Environmental Protection (Noise Control)



Low Noise Generator

Low Noise Breakers

Phooooh! Boooooh! Phu, Phu, Phu! Bhu, Bhu, Bhu!

JICA Advisor (TEC) 22 06/05/2018

This slide focuses on noise control. It features images of a blue noise generator and green noise breakers. Below these are images of a traffic jam with speech bubbles containing sound effects: 'Phooooh!', 'Boooooh!', 'Phu, Phu, Phu!', and 'Bhu, Bhu, Bhu!'.

### Environmental Protection (Vibration Control)



Low Vibration Construction Equipment

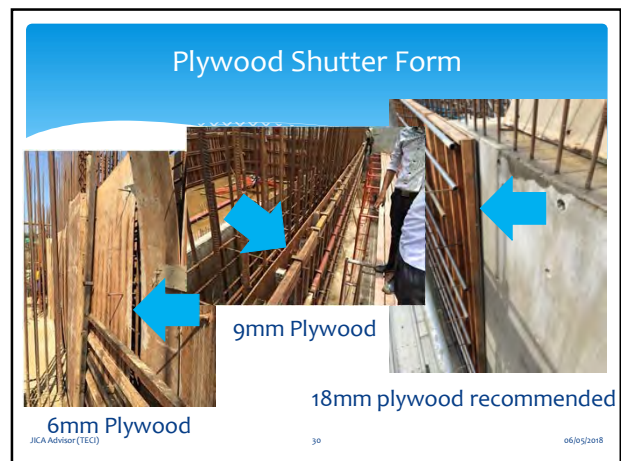
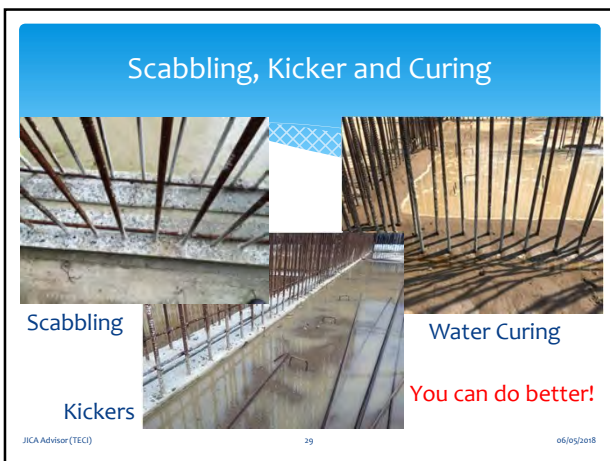
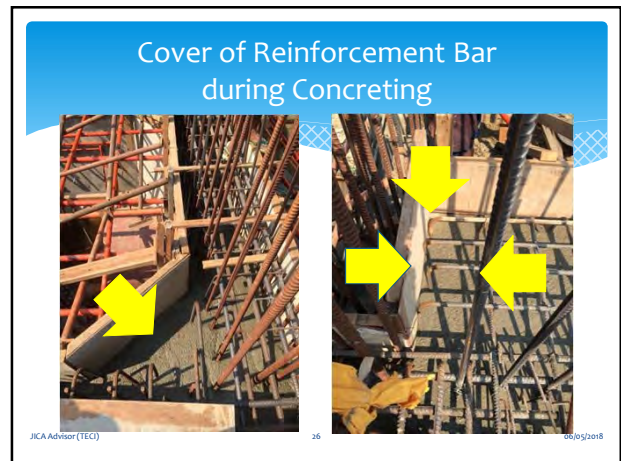
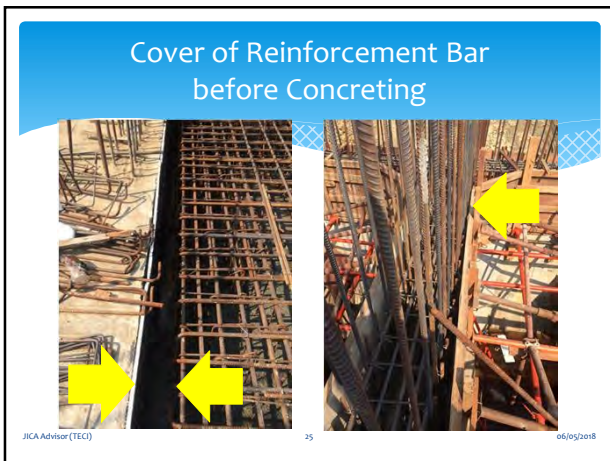
JICA Advisor (TEC) 23 06/05/2018

The image shows various pieces of construction equipment, including a red pile driver, a yellow excavator, and a yellow roller, all labeled as low vibration equipment.

### Workmanship

JICA Advisor (TEC) 24 06/05/2018

This slide is a simple blue background with the word 'Workmanship' centered in white text.





### Chamfers

JICA Advisor (TEC) 06/05/2018

### Form Ties and Separators

Before JICA Advisor (TEC) 32 06/05/2018

### Improved Rubber Cones

But not good enough! JICA Advisor (TEC) 33 06/05/2018

### Cosmetic Finish on Walls (1/2)

Inside of Structures JICA Advisor (TEC) 34 06/05/2018

### Cosmetic Finish on Walls (2/2)

Outside of Structures JICA Advisor (TEC) 35 06/05/2018


### Our Objective = Produce the Best Structures

Target Finishes  
+) Good Re Bar Fixing  
Good Form Work  
Good Concreting  
**Good Finishes!**


JICA Advisor (TEC) 36 06/05/2018

### Areas of Concern - Waterproofing


Waterproof Painting



Movement Joint



Surface Waterstop



**Water retaining structures must be watertight.**

JICA Advisor (TEC) 37 06/05/2018

### Fill Materials



↑

Unsuitable Materials can not be compacted



↑

River Sand

JICA Advisor (TEC) 38 06/05/2018

### Lessons learned from the Site

Temporary Works, such as access road, working platform, formwork and safety measures are key activities for good progress and quality products!

**Better Permanent Works are from better Temporary Works!!**

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### Planning and Programming

JICA Advisor (TEC) 40 06/05/2018

### Planning Works

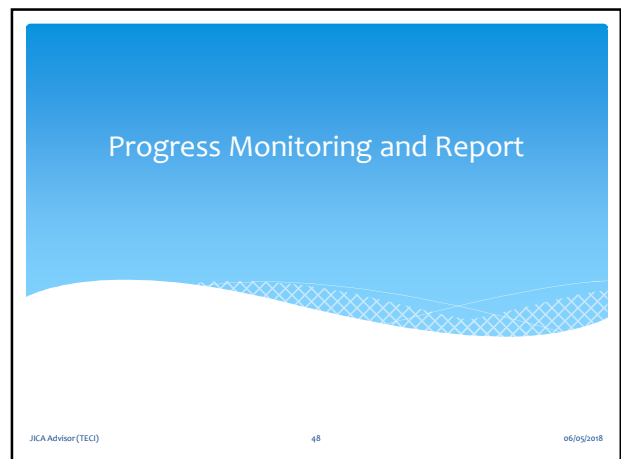
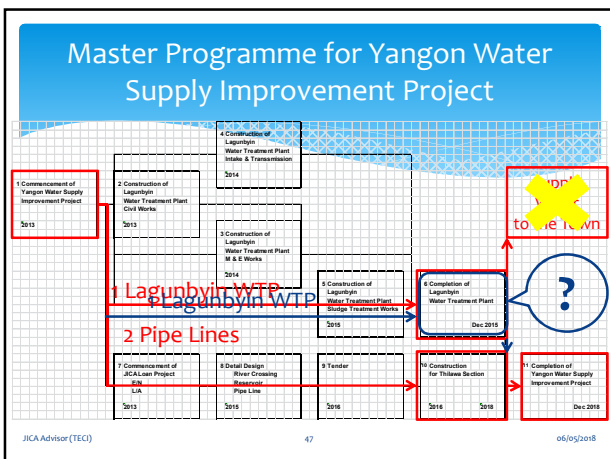
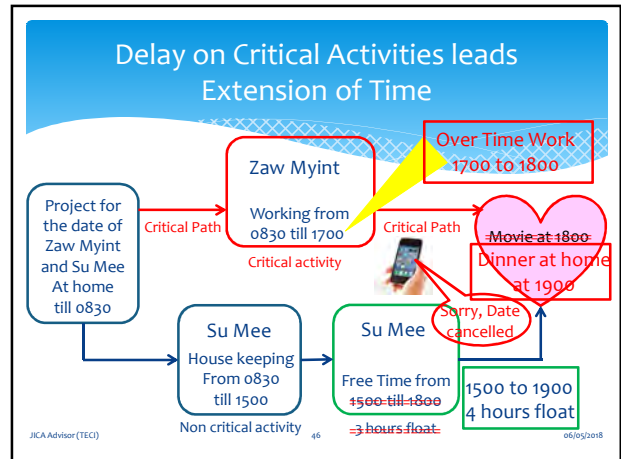
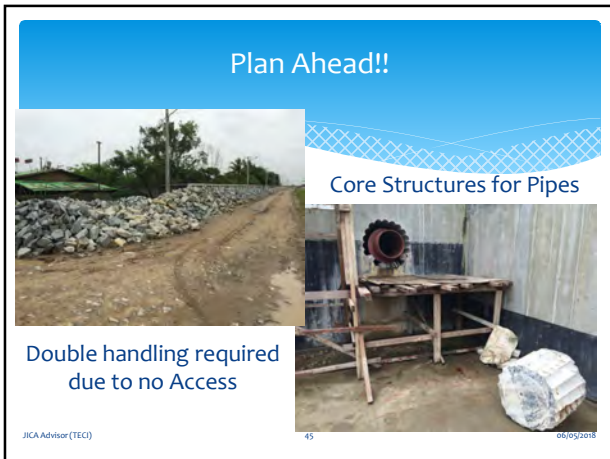
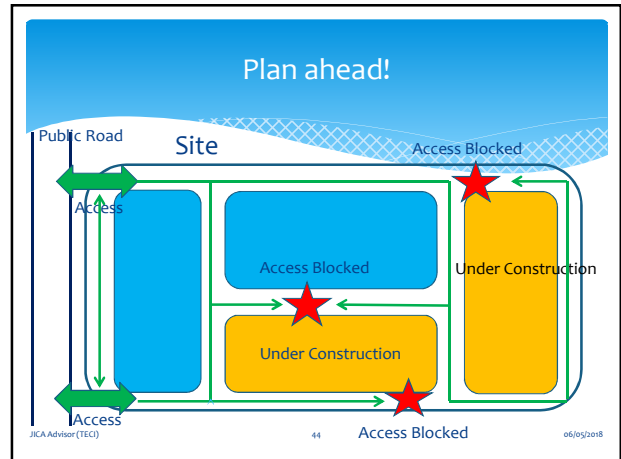
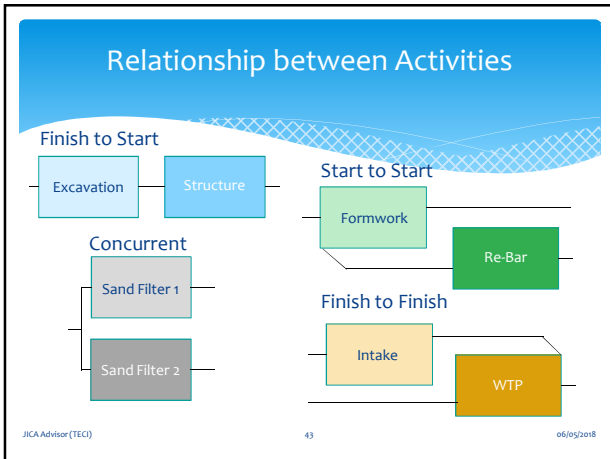
- \* Design and Standard
- \* Specification
- \* Drawings
- \* Method Statement
- \* Overall Programme
- \* Procurement of Services, Materials and Plant
- \* Health and Hygiene (OHSAS)
- \* Quality Assurance (QA) and Document Control
- \* Environmental Management System (EMS)

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### Planning Activities

- 1 Identify activities  
Review method of construction
- 2 Calculate quantity of each activity  
m3, m2, m, ton, no etc.
- 3 Assess progress rate of each activity  
per month, per week, per day etc.
- 4 Check relationship between activities  
Review the sequence of the works
- 5 Draw strategic plans in every 3 to 6 month  
Check performance and access on site

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## Task of Site Management

**Supervise, Monitor, Review, Test and Report:**

- \* Safety (Safety Manual)
- \* Workmanship (Drawings and Specifications)
- \* Materials (Specifications and Method Statement)
- \* Labours (Trade and Numbers)
- \* Plant and Equipment (Method Statement)
- \* Construction Method and Sequence
- \* Planning and Programme (Works Programme)
- \* Environmental Issues (Site and Office)
- \* Payments (Assess Progress and Bill of Quantities)
- \* Reports and Meetings

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## Time Control (1/2)

- \* Establish the baseline programme based on the information available at the time of Tender;
- \* Confirm the critical path on the works programme;
- \* Record actual progress of the works;
- \* Identify reasons why the actual progress is different from the planned progress (ahead or behind of the baseline programme);
- \* Review the sequence, methods and resources of the works;
- \* Establish recovery measures;
- \* Revise the programme to minimise delay; and
- \* Monitor the progress of the works based on the revised PGM.

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## Time Control (2/2)

During course of the works:-

- 1 Review activities on the critical path; and
- 2 Review other activities against their floats.

If activities on the critical path are behind the planned timings:-

- 1 accelerate activities on the critical path; or
- 2 change sequence of the works and confirm new critical path.

If other activities are delayed against the planned schedules:-

- 1 accelerate activities; or
- 2 change sequence of the works and confirm they are out of critical path.

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## Reports

- \* Monthly Report
  - Executive Summary (Status of the Project)
  - Safety, QA and Environmental Protection (How perform)
  - Design (Scope Control)
  - Construction (Method Control)
  - Progress and Programme (Time Control)
  - Suppliers and Contractors (Quality Control)
  - Commercial
    - Cost and Final Forecast (Cost Control)
    - Variations and Claims (Contract Administration)
    - Cash Flow (Financial Control)
  - Staff (Human Resources)






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## Meetings

- \* Daily Meeting
  - Site meeting among site staff from each party
- \* Weekly Meeting
  - Progress review meeting between engineers from each party
- \* Monthly Meeting
  - Technical and commercial review meeting between management of each party
- \* Steering Committee Meeting
  - between senior management and Project Office

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## Engineer's Five Questions Before commencing the Works

-  Information (Specification and Drawings) available?
-  Physical access to the Site available?
-  Plant and Materials available?
-  Workers available?
-  Cash flow allows?

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## Contracts Document

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## Tender Documents (JICA)

- \* Part 1 Tender Procedures  
Sample Bidding Documents under Japanese ODA Loans (October 2012 version 1.0, JICA)
- \* Part 2 Works Requirements  
Specifications  
Drawings  
Bills of Quantities  
Other Information
- \* Part 3 **Conditions of Contract (MDB Version)**  
and Contract Forms

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## Multilateral Development Bank (MDB) Harmonised Edition



\* MDB Harmonised Edition 2006 is edited for development banks basing on the red book 1999 version and revised in 2010.

Particular Sub-Clauses added are:-

- \* Sub-Clause 1.15 Inspections and Audit by the Bank.
- \* Sub-Clauses for Drugs, Arms, Religious Customs, Funerals, Forced Labour, Child Labour, Worker' Organisation, Non-Discrimination and Equal Opportunity.

**Pink Book – Designed by the Employer**

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## Arrangement of MDB Version

The contract under the Pink Book (FIDIC MDB Version) is a remeasurement contract with approximate Bill of Quantities.

The quantities in the Bill of Quantities are approximate only and are subject to remeasurement upon completion of works on site.

Items could be lump sum if the accurate quantities for the activities measured from the fully completed design in the pre-contract stage.

Lump sum items with drawings and specification are applicable to the electrical and mechanical works. However, measurement is required to assist in valuation of the variations.

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## Conditions of Contract can be adjusted

<p><u>Risk</u></p> <ol style="list-style-type: none"> <li>1 Quantity</li> <li>2 Inflation or Exchange</li> <li>3 Design Responsibility</li> </ol> <p><u>Requirements</u></p> <ol style="list-style-type: none"> <li>1 Performance</li> <li>2 Programme</li> </ol>	<p><u>Type of Contract</u></p> <ol style="list-style-type: none"> <li>1 measurement or lump sum</li> <li>2 with fluctuation or fixed</li> <li>3 the Employer's design or the Contractor's design.</li> </ol> <p><u>Conditions</u></p> <ol style="list-style-type: none"> <li>1 Fitness of Purpose</li> <li>2 Liquidated Damages</li> </ol>
---	--

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## Objective of Prequalification

- \* The prequalification is to identify those who are interested and capable of undertaking the contract and to keep tendering cost minimum.
- \* Tenderers will only be invited from the list of pre-qualified contractors.
- \* The qualification requirements shall be limited to those which are essential to ensure that prequalified tenderers are capable of executing the contract.
- \* There shall be no discrimination against local or overseas contractors.

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## Type of Prequalification

- \* There are two types of prequalification:
  - a) prequalifying only a limited number of contractors (say 3 or 4) i.e. those scoring the highest marks in the prequalification exercise; or
  - b) prequalifying all contractors who meet the qualification requirements.
- \* The Express of Interest may be asked from potential tenderers prior to the prequalification.

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61

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## Budget and Cost Control

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62

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## Cost Control

- \* Principle of Cost Control  
Budget vs Cost
- \* Information required for Cost Control
  - Prepare Bill of Quantities based on the requirements in the Specification and the Drawings
  - Price BOQ by estimating each activity
  - Plan monthly budget in accordance with the PGM
  - Forecast monthly cost and prepare S-Curve
  - Cost keeping in accordance with Cost Centre
  - Check Cash Flow
- \* Final Forecast

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63

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## Definition of Bill of Quantities

- \* The term Bill(s) of Quantities is defined in the method of measurements as a list of items giving brief identifying descriptions and estimated quantities of the works to be performed.
- \* Quantity is simple but one of the biggest risks not only for the Contractor but also for the Employer.
- \* BOQ (BQ) forms a part of the contract documents and is the basis of payment to the Contractor.

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64

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## Objective of Bill of Quantities

The BOQ should be prepared correctly.

The following four main objectives of the document should always be kept in mind during preparation of BOQ.

- a) to enable tenders to be obtained from tenderers;
- b) to form the basis for tender comparison;
- c) to provide means of valuing the works; and
- d) to form a basis for fixing any rates not included in the BOQ or valuing any variations.

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65

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## Grand Summary of BOQ

- |   |   |
|---|---|
| 1 | Bill No 1 Preliminaries                             |
| 2 | Bill No 2 Construction/Structures                   |
| 3 | Bill No n Construction/Structures                   |
| 4 | Bill No X Prime Cost (by Nominated Sub-Contractors) |
| 5 | Bill No Y Provisional Sums                          |
| 6 | Bill No Z Daywork                                   |
|   | <hr/>   |
|   | Total   |
| 7 | Adjustment Item                                     |
| 8 | Contingency   |
|   | <hr/>   |
|   | Grand Total (Tender Price)                          |

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66

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### Method of Measurement

Excavation Volume: How to measure excavation or filling volume? measure actual volume? or theoretical volume?

Re Bar: How to measure reinforcement bar? measure lap length? or ignore lapping?

GL, Pile Head: How to measure piling length? measure actual length? or bored length?

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### Project Management under FIDIC Contracts

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### Project Management (1/2)

- \* **Technical**
  - Basic Design (Permanent Works and Construction Technique)
  - Detail Design (Structures, Plant and Temporary Works)
  - Programme (Overall and Detail)
  - Construction Method (Permanent and Temporary Works)
  - Construction Supervision (SQE, Production and Progress)
- \* **Support**
  - Procurement (Services and Materials)
  - Logistics
  - Safety, Quality Assurance and Environmental Protection

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### Project Management (2/2)

- \* **Commercial**
  - Financial (Payment and Cost Control)
  - Contractual (Variations and Claims)
- \* **Administration**
  - General Affairs
  - Finance and Accountant
  - Human Relations
  - Public Relations

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### The Employer, The Engineer and The Contractor under FIDIC Contracts

**The Employer** prepare the requirements for his objective.  
Also the Employer appoint the Engineer and employ the Contractor.

**The Engineer** will administer the Works in accordance with the Contract.

**The Contractor** will execute and complete the Works in accordance with the Contract.

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### Contracts Administration by the Employer

**YCDC Head Office - The Employer**

- Chief Engineer
- Technical: Coordination, Design & IT, Planning, Programming
- Commercial: Contract ADM, Procurement, Cost Control, Payment
- Administration: Administration, Account, Office

**Project Management Consultant**

**Project Implementation Unit (PIU) - Project Manager**

- Construction: Meetings, Submissions, Inspection, Surveying
- SQE: Public Relations, Document, Commercial

**The Contractor**

Together, act the Engineer's Role

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### Honeymoon Period started when the Contract signed

**The Tender Proposal:**

- 1 Construction Method
- 2 Tender Programme
- 3 Tender Price

**Accepted**

**The Contract Execution:**

- 1 Each Method Statement (Sequence, Materials, Plant etc.)
- 2 Works Programme
- 3 Contract Price



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### Problems come up when Honeymoon period passed

Society/Law

**the Contract**

**the Works**

Price based on

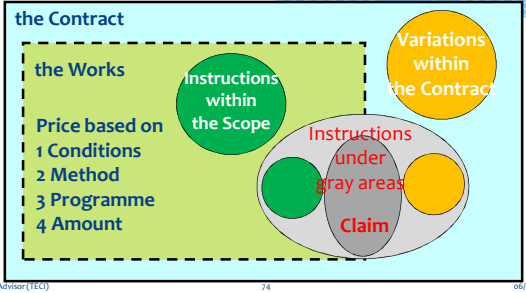
- 1 Conditions
- 2 Method
- 3 Programme
- 4 Amount

Instructions within the Scope

Variations within the Contract

Instructions under gray areas


Claim



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### Conflict of Interest between the Employer and the Contractor

Objective is a successful completion of the project.  
All stakeholders are in the same boat.




The Employer **to pay** vs The Contractor **to be paid**

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### Question and Answer

**Q + A = progress**

Ever Forward, a Step by a Step



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### Epilogue

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### The Contractor, The Engineer, YCDC, Subcontractors, JICA and all Stakeholders



**Strive to win with Team Work !**

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Are you ready for JICA Loan Projects?

Yes, we are!

Wish you all the Best!  
See you again!!



If not, please contact Akiba san of TECI.

JICA Advisor (TECI) 79 06/09/2018

ကျေးဇူးတင်ပါတယ်  
Arigatou gozaimashita  
Thank You



JICA Advisor (TECI) 80 06/09/2018



JICA assisted Capacity Development on  
Lagunbyin Water Treatment Plant under  
Greater Yangon Water Supply Improvement Project  
implemented by YCDC

## Waterproofing of Water Retaining Structure and its Remedial Works

Seminar No 15, 17 January 2017  
JICA Advisors for Monitoring of LWTP Construction

### Engineer's Activities starts from **Safety**, always!

JICA Advisor (TEC) 2 06/05/2018

### Subjects from the Previous Seminar

- Safety, Quality and Environment
- Workmanship
- Planning and Programming
- Progress Monitoring and Report
- Contracts Document
- Budget and Cost Control
- Project Management under FIDIC Contracts

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## Design of Water Retaining Structure (WRS)

JICA Advisor (TEC) 4 06/05/2018

### Design

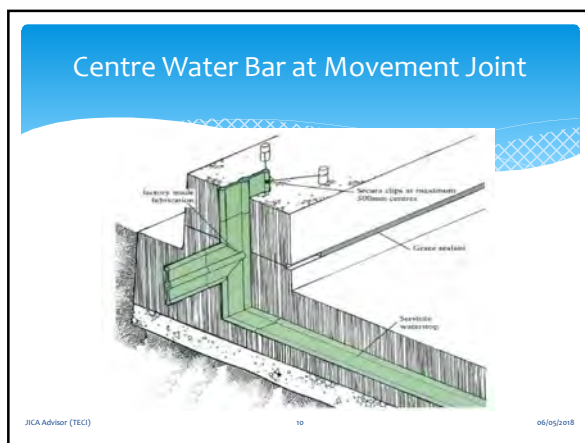
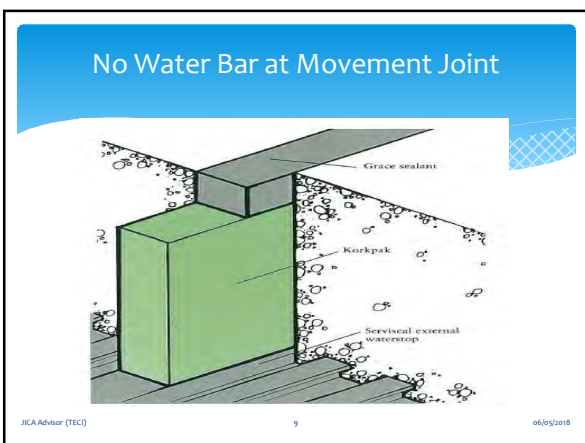
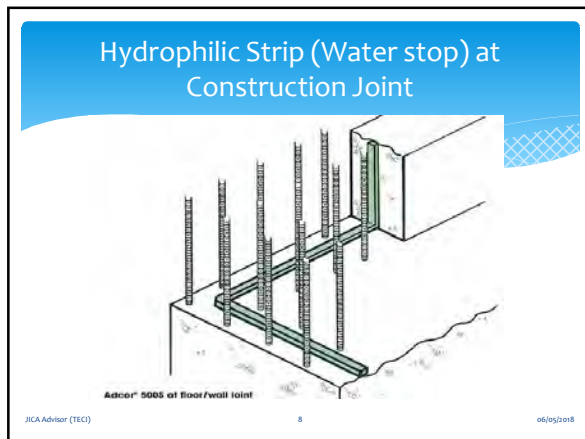
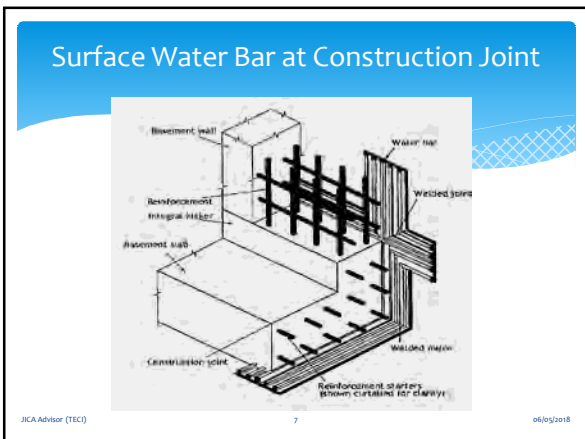
Consider to avoid cracks and leakages:-

- 1 Movements due to shrinkage and creep;
- 2 Movements due to temperature and humidity;
- 3 Movements due to dissipation during hydration;
- 4 Damage to the concrete due to percolation of chemically aggressive liquid from outside;
- 5 Damage due to uneven settlement of foundations
- 6 Cracking of concrete caused by rusting bars; and
- 7 Hydrostatic uplift force

JICA Advisor (TEC) 5 06/05/2018

### Typical Waterproofing and Water Bar (Stop)

JICA Advisor (TEC) 6 06/05/2018



- ### Conclusion
1. Collect information from construction material suppliers (specialist) in order to design better construction joint and movement joint.
  2. Design thicker walls for long life and slabs with crack inducer to avoid cracking at random.
  3. Design concrete mix and its admixture, water/cement ratio (55%), slump (less than 100mm), smaller spacing of distribution re-bar
- JICA Advisor (TEC) 11 06/05/2018

### Construction of WRS on Site

JICA Advisor (TEC) 12 06/05/2018

### Workmanship

- \* Care of waterproofing membrane
- \* Installation of water bar and water stop at CJ, MJ and around pipes including separators
- \* Maintaining concrete cover (50~75mm)
- \* Concreting less than 1m high, slump < 100mm, temp. < 35°C
- \* Plan concreting sequence and avoid cold joint
- \* Continuous operation of vibrators (enough but not too much)
- \* Scrabbling of concrete surface at construction joint
- \* Curing of concrete (more than 7 days)


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### Concreting



JICA Advisor (TEC) 14 06/05/2018

### Scabbling, Kicker and Curing



Remove Laitance  
Kickers

Water Curing  
**You can do better!**

JICA Advisor (TEC) 15 06/05/2018

### Lessons learned from the Site

Temporary Works, such as access road, working platform, formwork and safety measures are key activities for good progress and quality products!


**Better Permanent Works are made from better Temporary Works!!**

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## Existing Conditions

JICA Advisor (TEC) 17 06/05/2018

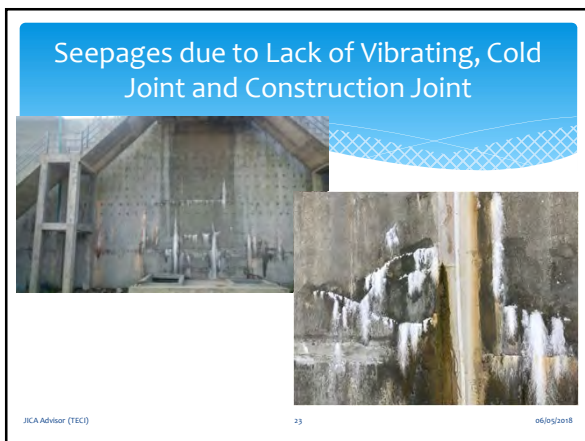
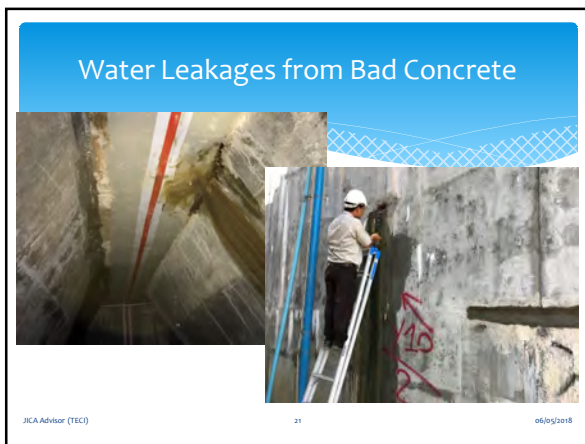
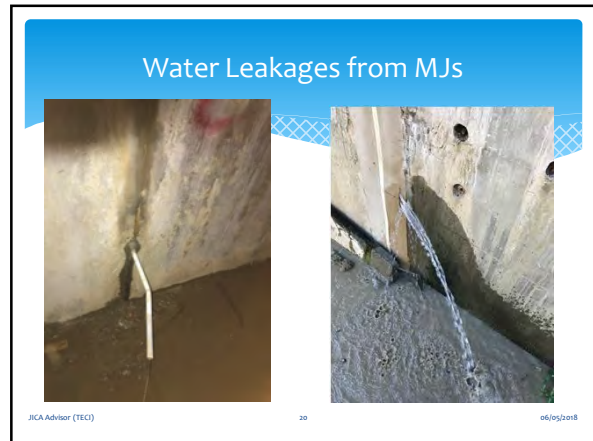
### Walls Now!



Rapid Sand Filter 2

Sedimentation Basin 4

JICA Advisor (TEC) 18 06/05/2018





### Cause of Water Leakage

- \* Lack of Vibrator → Honeycomb
- \* Lack of Curing → Shrinkage Crack
- \* Lack of Scabbling or Laitance removal at CJ
- \* Improper Concreting Sequence → Cold Joint
- \* Improper Installation of Water bar (stop) at MJ and CJ

Water leakage is caused by **bad workmanship**, if design is correct.

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### Remedial Works

JICA Advisor (TEC) 26 06/05/2018

### V – Cut (remove bad concrete) and Fill

JICA Advisor (TEC) 27 06/05/2018

### Injection without V - Cut

JICA Advisor (TEC) 28 06/05/2018

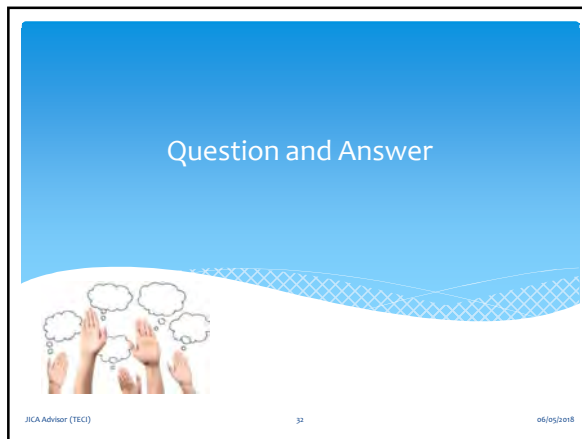
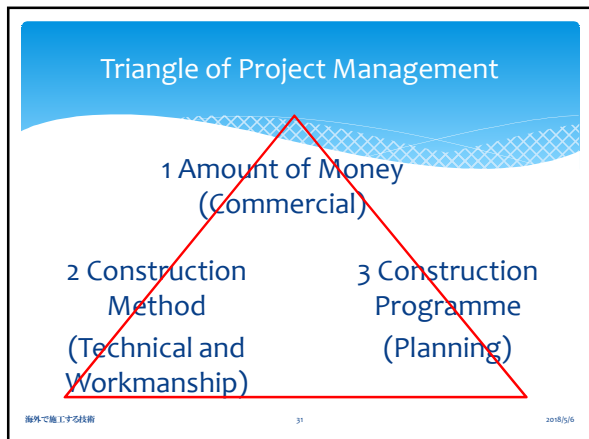
### After Remedial Works

JICA Advisor (TEC) 29 06/05/2018

### Why Interview and Trial?

<p><b>Interview</b></p> <ol style="list-style-type: none"> <li>1 Review proposer's ability (workers, materials, plant and programme) to carry out the works in accordance with requirements; and</li> <li>2 Confirm their conditions (technical and commercial) for proposal.</li> </ol>	<p><b>Trial</b></p> <ol style="list-style-type: none"> <li>1 Review sequence and method of the works in accordance with their method statement; and</li> <li>2 Review proposer's performance.</li> </ol> <p style="color: red; text-align: center;"><b>Seeing is believing One seeing &gt; 100 Listening</b></p>
--	--

JICA Advisor (TEC) 30 06/05/2018





**Name List for Seminar (Civil) Attendance**

No	Name	Designation	2017
			Jan 17 HO
	HO=Head Office	S=Site	HO
	TECI		
1	Minoru IKEI	Chief	
2	Junjiro AKIBA	Civil	*
3	Koichi NAOI	Electrical	
4	Shinichi OSAKA	Mechanical	
5	U Pyi Kyaw Hein	AE-Civil	*
	YCDC		
15	U Than Han	EE	*
20	Daw Aye Pa Pa Nyo	EE	*
22	U Tint Zaw	AE	*
30	Daw Yu Yu Hla Baw	AE	*
32	U Aung Ko Ko Tin	SAE	*
33	U Tun Tun Hlaing	SAE	*
34	U Kyaw Swar Min	SAE	*
36	U Than Wynn	SAE	*
37	U Zin Min Latt	SAE	*
40	U Kaung Khant	SAE	*
41	U Aung Ko Ko Win	SAE	*
43	U Zaw Win Aung	SAE	*
48	Daw Su Su Aung	SAE	*
49	Daw Ya Min	SAE	*
55	Daw Myat Thet Khin	SAE	*
56	Daw Htike Htike Khine	SAE	*
62	U Nyein Chan Aung	Watches	*
69	Daw Hwe Ni Aung	JE	*
70	Daw Moh Moh San	WA	*
73	Daw Aye Aye Kyu	Flat	*
74	Daw Mi Htwe Lay	WA	*
75	Daw Khine Cho Win	WA	*
76	Daw Ei Thu Lwin	WA	*
77	U Ye Zay Ya	Flat	*
78	Daw Aye Myat Thu	Flat	*
79	Daw Thiri Win	Flat	*
80	Daw Phu Pwint Wai	Flat	*
81	Daw The Yu Nandar	WA	*
82	Daw Tin New Aye	WA	*
83	Daw Ei Ei Phyo Win	WA	*
84	Daw Zin Htet Oo	WA	*



## CAPACITY DEVELOPMENT ON CONSTRUCTION OF LAGUNBYIN WATER TREATMENT PLANT UNDER GREATER YANGON WATER SUPPLY IMPROVEMENT PROJECT

**Final Seminar**  
26<sup>th</sup> March 2018

TEC International Co., Ltd

### Target of the Project

Advice to YCDC's construction supervision  
for Lagunbyin WTP construction

Intake Pump Station WTP

### Purpose of the Project

**Overall Goal**  
"Greater Yangon Water Supply Improvement Project" ('Phase 1 of ODA loan') is to promote the operation and the development effect.

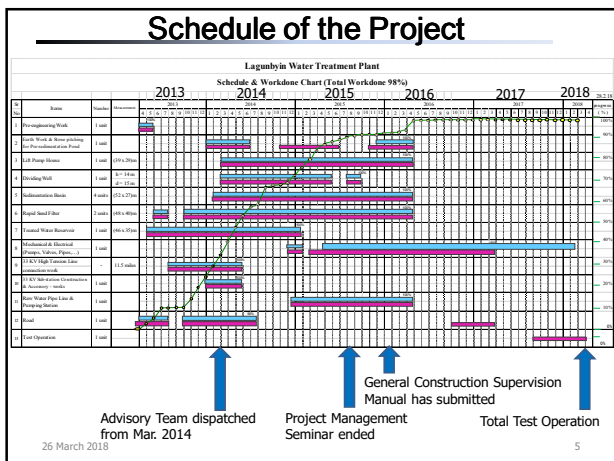
**Project Goal**  
YCDC's capacity of construction supervision is developed.

26 March 2018 3

### Expected Outputs and Achievement



Nos.	Expected Outputs	Achievement
1)	To procure suitable materials and equipment on the detail design	Achieved by Completion of WTP
2)	To operate a proper quality control	Ditto
3)	To operate a safety control for workers	Achieved (No Accident)
4)	To operate a timely progress control on a construction schedule	Achieved except Intake pumps (See the next Slide)
5)	To operate a proper environmental monitoring	Achieved (No Accident)
6)	To improve YCDC's capacity development in terms of construction supervision (quality control, safety control, progress control, environmental monitoring, etc.)	Achieved by compile of the Manual through 14 times of Seminar
7)	To develop YCDC's understanding of environmental and social consideration	Ditto

26 March 2018 4




### Outputs of the Project (1/4)


**Project Management Seminar**  
14 times

**General Construction Supervision Manual**  
Submitted in Jan. 2016  
To be used for YCDC's constructions in the future



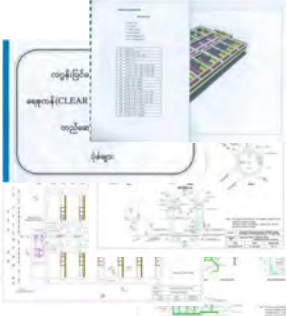
Issued Certificates for Participants




26 March 2018 6

### Outputs of the Project (2/4)

**Design/As Built Drawings**




**Document of Construction Supervision**



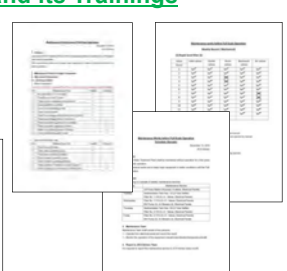
26 March 2018

### Outputs of the Project (3/4)

**Specifications of Mechanical/Electrical Equipment, and its Evaluation in Biddings**



**Maintenance Records before Full-Scale Operation for Equipment, and its Trainings**



26 March 2018

### Outputs of the Project (4/4)

**Total Test Operation (Topic of This Seminar)**

- Planning
- Preparation
- Manpower
- Results
- Recommendations

26 March 2018

### Total Test Operation

**Planning**

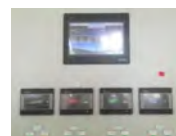


- **Schedule:** Preparation March 7 to 10  
Test Operation March 12 to 24  
48-hour operation x 4 batches
- **Flow :** 5 MGD (1/8 of design)/batch
- **Facilities:** Intake Pump Station, Dividing Well, Sedimentation Tank (No.3&4), Filter (2), Clear Water Tank, Waste Water Tank
- **Check Points**
  - ✓ Flow
  - ✓ Water Quality (turbidity, color, pH, temp.)
  - ✓ Visual Inspection (settled & filtered water)
  - ✓ Jar Test (floc formation etc.)
  - ✓ Filter sand sieve analysis

26 March 2018

### Total Test Operation

**Preparation**

- Intake Pump Station: flow setting
- ACH: temporary dosing tank
- ACH: approx.20L/hr for raw water 8-15 NTU
- pH meter, turbidity meter, color meter, Jar Tester
- Sieving machine
- Temporary stop logs for sedimentation tank







26 March 2018

### Total Test Operation

**Manpower (At least)**

- Intake pump station : 1 operator/24 hr
- ACH dosing : 2 operators/24 hr
- Filter : 2 operators/24 hr
- Water/Sieving analysis & Jar test : 2 persons/12hrs

26 March 2018

### Total Test Operation

**Result 1: Flow**



- Intake Pump Station Operation
  - ✓ Operation hour : 48 hrs. x 4 batches
  - ✓ Actual operation hour : 187 hrs. / 192 hrs.
  - ✓ Total flow : 176,342 m3
  - Average : 22,043 m3/day (4.85MGD)
  - ✓ Electricity : 10,240 kWh
- Power Outage
  - ✓ March 12 5:12-5:50AM (39 min)
  - ✓ March 13 6:29-7:50AM (82 min)
  - ✓ March 16 6:58-9:10AM (193 min)

26 March 2018 13

### Total Test Operation

**Result 2: Water Quality (1/3)**

- ACH dosages were determine by the results of Jar tests.
- Jar Test : 8 to 16 ppm
- Actual Dosage : 11 to 19 ppm

26 March 2018 14

### Total Test Operation

**Result 2: Water Quality (2/3)**

- Filtered water by the Laboratory's results meet Drinking Standard.

Date	Location	Lab Code	pH	EC (µmhos/cm)	Hardness (mg/L)	Turbidity (NTU)	Color (PCU)	Total Hardness (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Total Alkalinity (mg/L)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Total Solids (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nitrate-Nitrogen (mg/L)	Nitrite-Nitrogen (mg/L)	Nitrogen-Nitrogen (mg/L)	Ammonia-Nitrogen (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	
15-Mar-18	ရေပိုက်(စစ်ဆေးခန်း)	030188	6.93	87	173	0.09	3.78	14	52	8.016	7.670	18	8	0.38	0.077	0.002	0.01	0.02	1.00	1.00	0.02				
15-Mar-18	ရေပိုက်(ကား)	030189	6.94	61	121	0.06	11.30	29	34	7.214	3.831	13	130	1.11	0.209	<0.002	0.01	0.02	0.02	0.00	0.01				
15-Mar-18	ရေပိုက်(စင်္ကြံ)	030190	7.14	66	132	0.07	3.19	16	52	11.220	5.748	17	72	0.29	0.022	0.000	0.01	0.04	1	0.04					

Date	Location	Lab Code	pH	EC (µmhos/cm)	Hardness (mg/L)	Turbidity (NTU)	Color (PCU)	Total Hardness (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Total Alkalinity (mg/L)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Total Solids (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nitrate-Nitrogen (mg/L)	Nitrite-Nitrogen (mg/L)	Nitrogen-Nitrogen (mg/L)	Ammonia-Nitrogen (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	
18-Mar-18	ရေပိုက်(ကား)	030201	6.78	40	121	0.04	4.05	31	48	11.220	4.790	12	76	1.44	0.254	0.020	0.01	0.13	0.1	0.07					
19-Mar-18	ရေပိုက်(စစ်ဆေးခန်း)	030200	6.92	68	137	0.07	1.72	27	48	8.815	6.710	13	84	0.29	0.246	0.020	0.01	0.04	1.00	1.00	0.07				
18-Mar-18	ရေပိုက်(စင်္ကြံ)	030202	7.16	70	141	0.07	0.91	11	48	8.815	6.710	12	84	0.14	0.218	0.008	0.01	0.22	0.1	0.12					

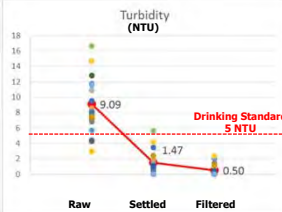
26 March 2018 15

**<5NTU <15TCU <1.0mg/L**

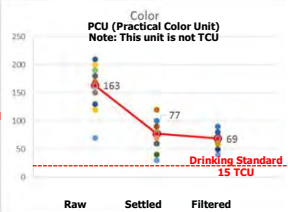
### Total Test Operation

**Result 2: Water Quality (3/3)**

- Filtered water meet Drinking Standard.
- Some difficulties for Color removal



Turbidity (NTU)



Color (PCU)


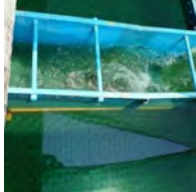
- Chlorination and proper coagulant dosing will improve clear water.

26 March 2018 16

### Total Test Operation

**Result 3: Floc and De-sludging in Sedimentation Tank**

- Proper floc are formulated and settled.

- Continuous de-sludging are required.

26 March 2018 17

### Total Test Operation

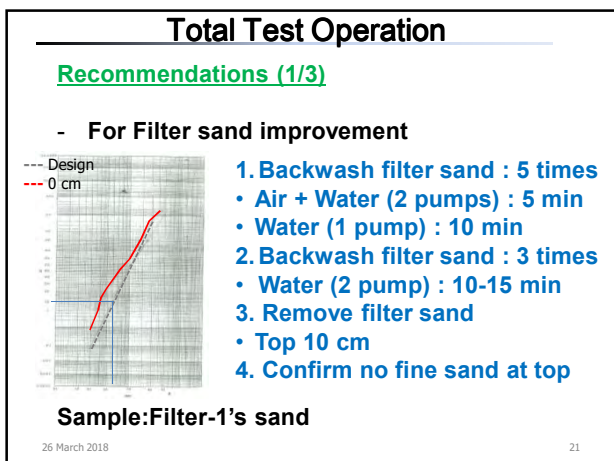
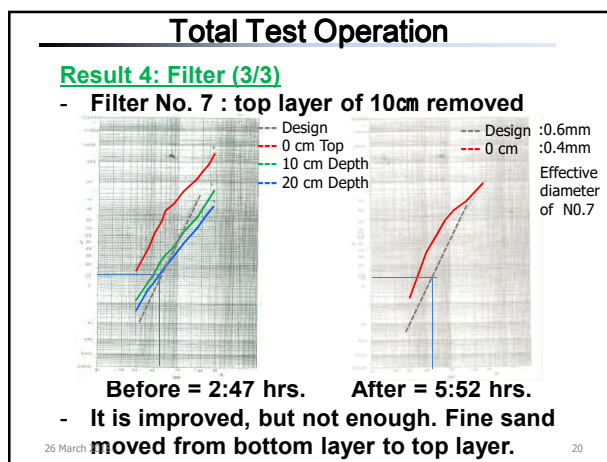
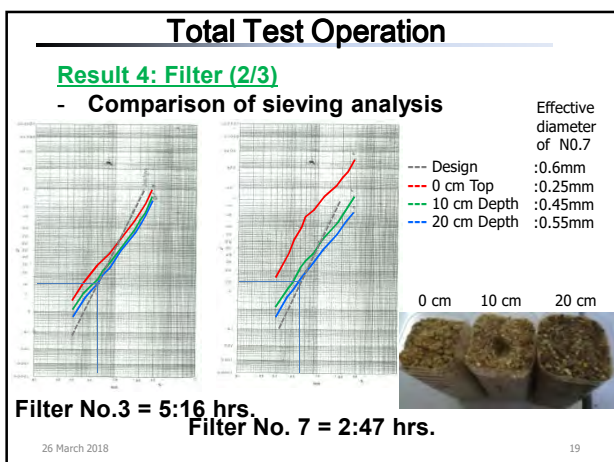
**Result 4: Filter (1/3)**

- Filtered water: Ave. 0.5 NTU < 5 NTU
- Filtration period: design 24 hrs.

Batch (hr)	No. 7	No. 8	No. 9
Batch 1 (hr)	02:47	03:19	02:45
Batch 2 (hr)	No. 10	No. 11	No. 12
	03:04	03:40	03:43
Batch 3 (hr)	No. 3	No. 4	No. 6
	05:16	05:12	03:35
Batch 4 (hr)	No. 1	No. 2	No. 3
	02:58	03:38	02:55
Batch 5 (hr)	No. 7	No. 9	No. 10
	05:52	04:30	04:07

- Short filtration period: Small size of filter sand

26 March 2018 18



- ### Total Test Operation
- #### Recommendations (2/3)
- Maintenance Works before 40 MGD operation
- Maintain mechanical/electrical equipment
  - Motors: Operate 5 minutes every week
  - Electrical panels: Supply electricity to keep space heaters ON
  - Dividing Well/Clear Water Preserver: Drying
  - Sedimentation Tanks: Drying and Cover inclined tubes by plastic sheet to avoid sun light
  - Filters: Drying and Cover filter sand by plastic sheet
- 26 March 2018 22

- ### Total Test Operation
- #### Recommendations (3/3)
- Final Start-up with 40 MGD before installation of transmission pumps under the Phase1 ODA loan.
- Chemical dosing adjustment
  - Adjusting "Automatic Backwash" of PLC by Machinery Solutions (SWTS)
  - Get assistance from JICA advisors, if necessary.
- 26 March 2018 23

ကျေးဇူးတင်ပါတယ်

Arigatou gozaimashita

Thank You

26 March 2018 24

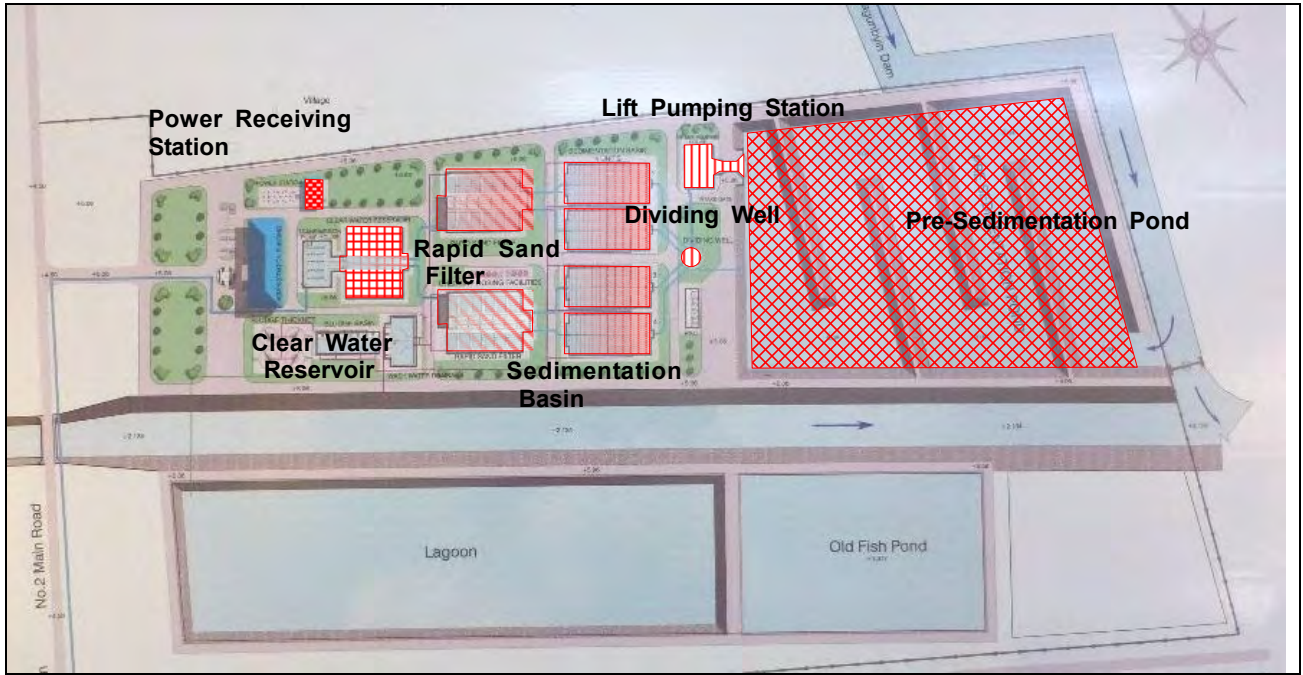
**Name List for Seminar Attendance**

No	Name	Designation	2018
			March
	HO=Head Office	S=Site	26
			HO
	TECI		
1	Minoru IKEI	Chief	
2	Junjiro AKIBA	Civil	*
3	Koichi NAOI	Electrical	
4	Shinichi OSAKA	Mechanical	*
5	U Pyi Kyaw Hein	AE-Civil	*
	YCDC		
7	U Myint Zaw Than	DCE	*
9	U Thet Lwin	ACE	*
15	U Than Han	EE	*
16	U Zaw Minn	EE	*
17	U Soe Kyaing	EE	*
22	U Tint Zaw	AE	*
23	U Phone Naing	AE	*
33	U Tun Tun Hlaing	SAE	*
			8

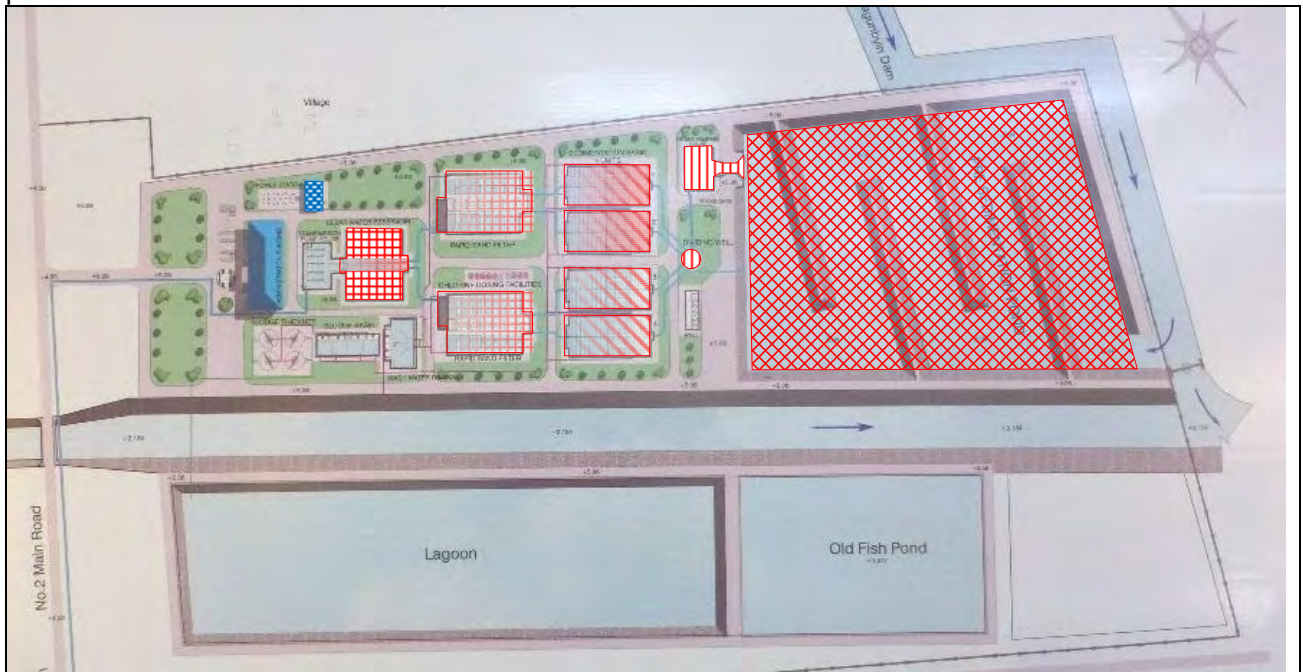


March 2014

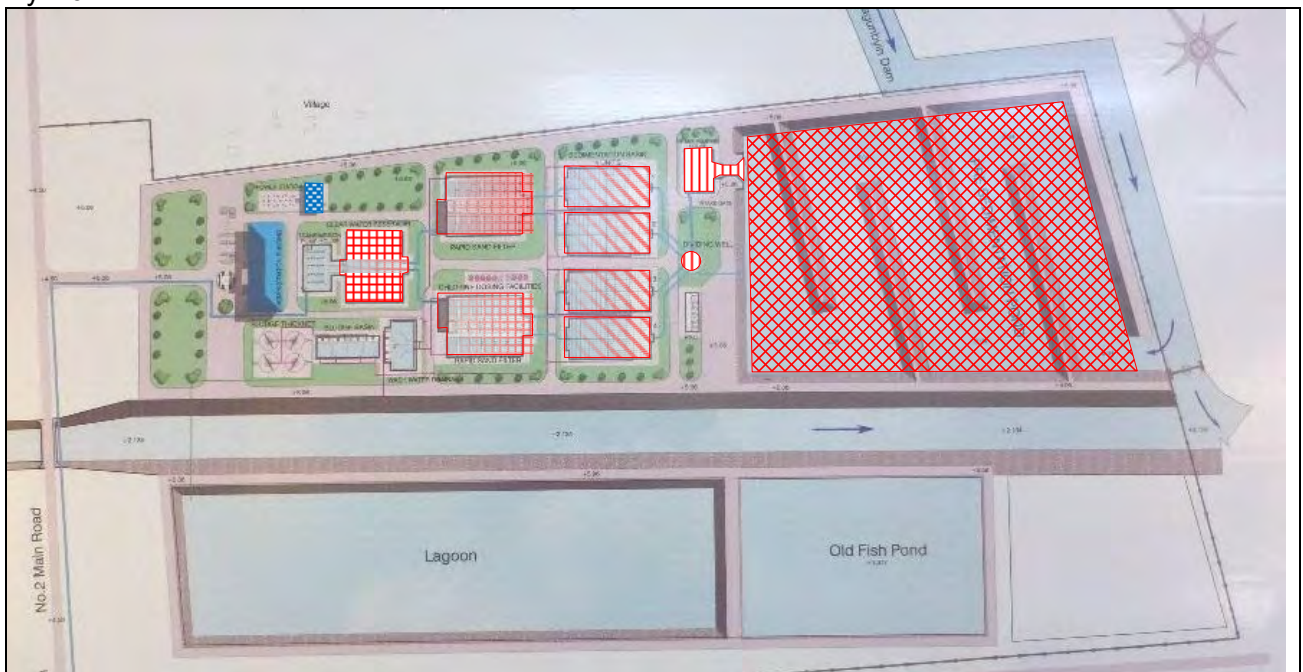
添付資料-10工事写真集



Apr 2014



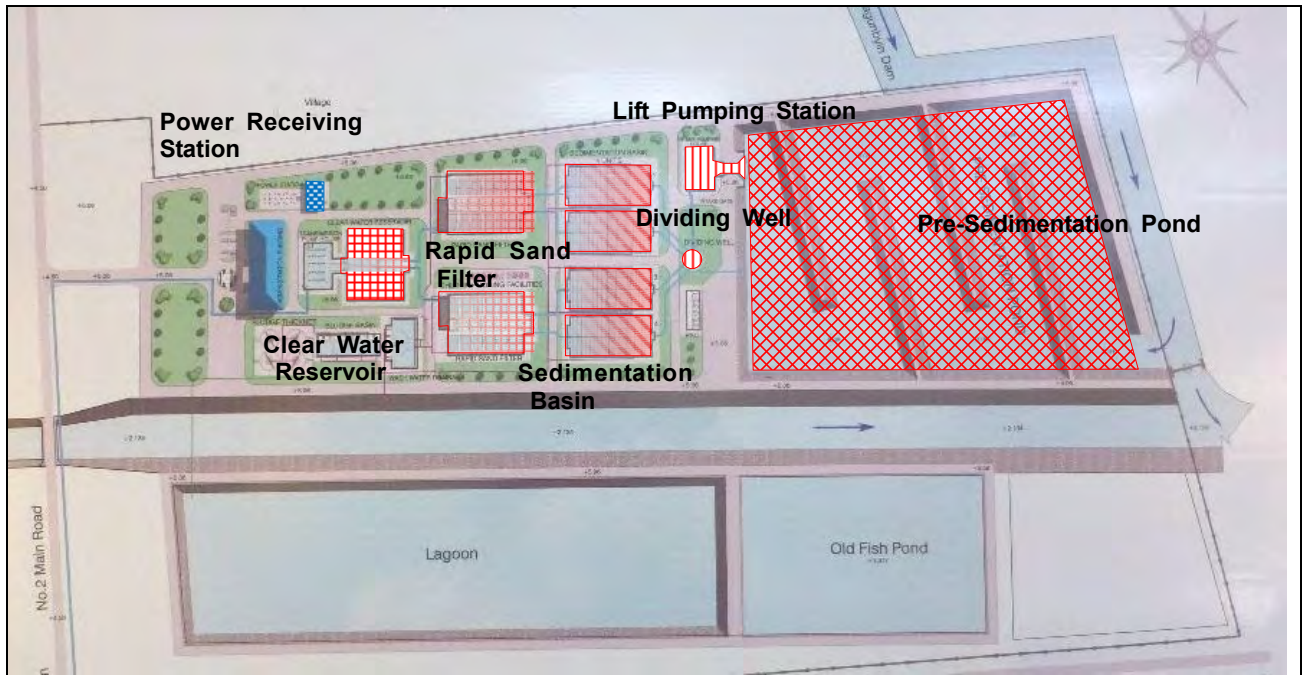
May 2014



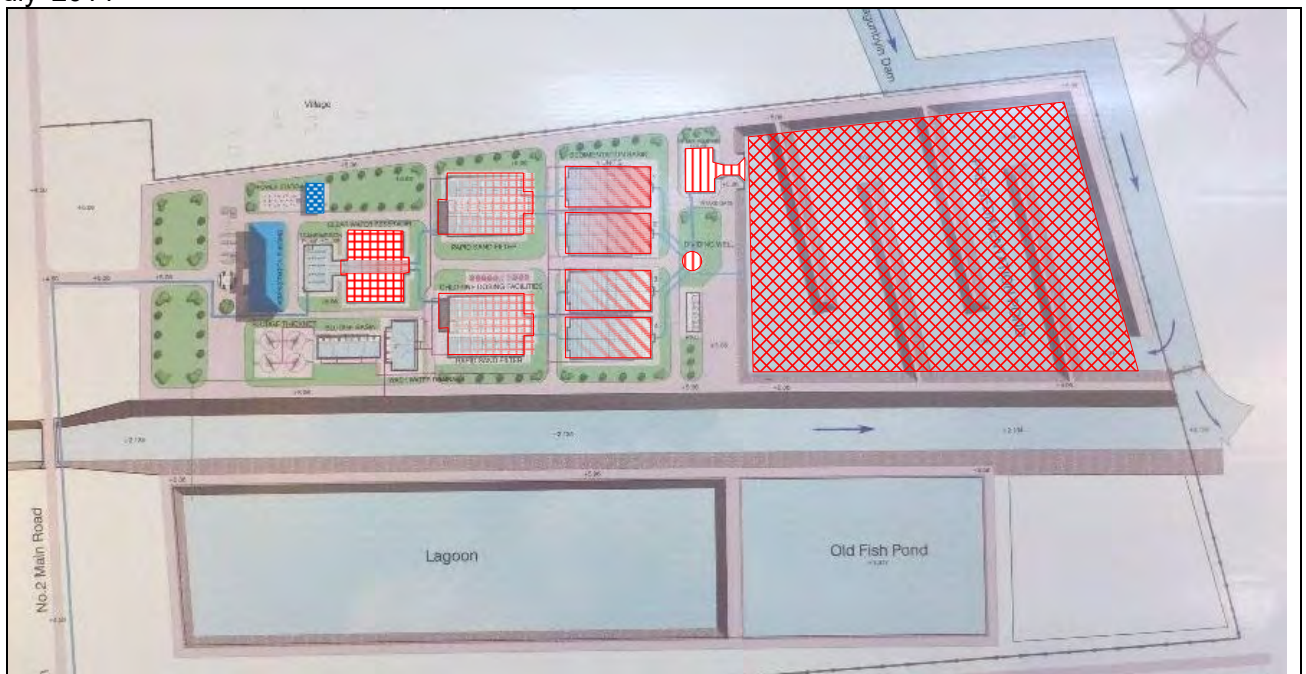


Status: ■ Under Construction (▨ Piles, ▨ Basement, ▨ Walls, ▨ Roofs) and ■ Completion

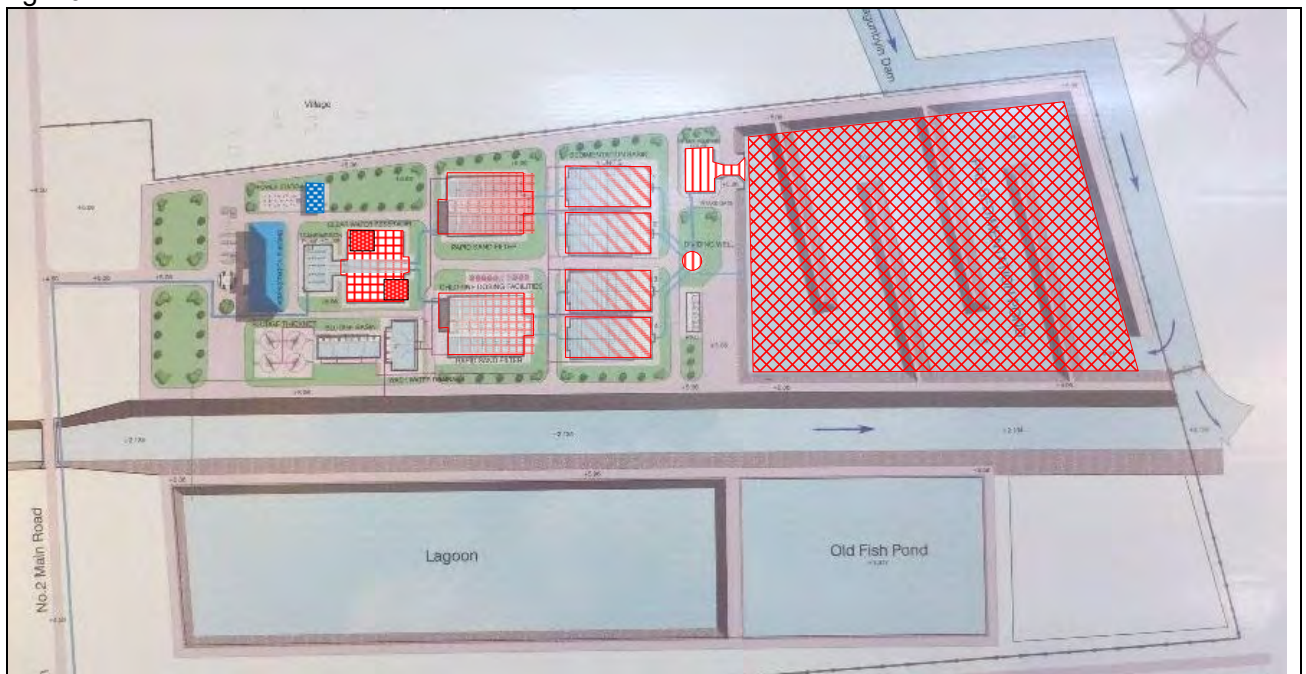
Jun 2014



July 2014



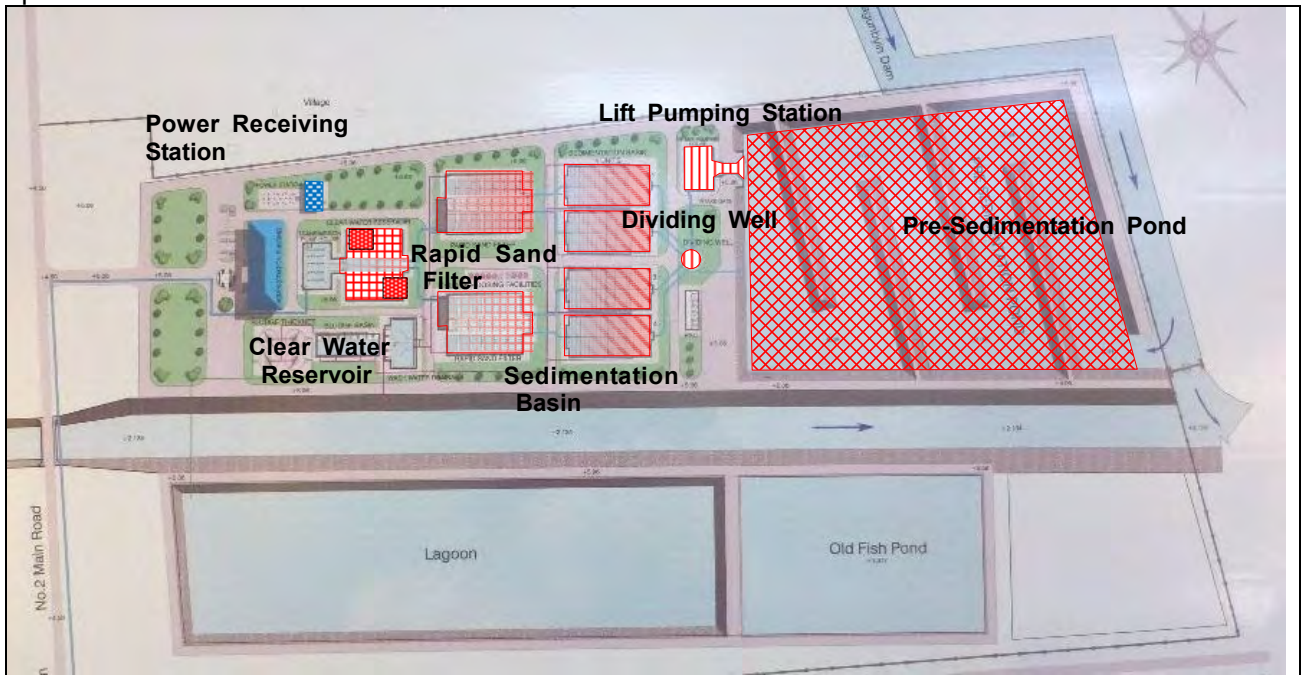
Aug 2014



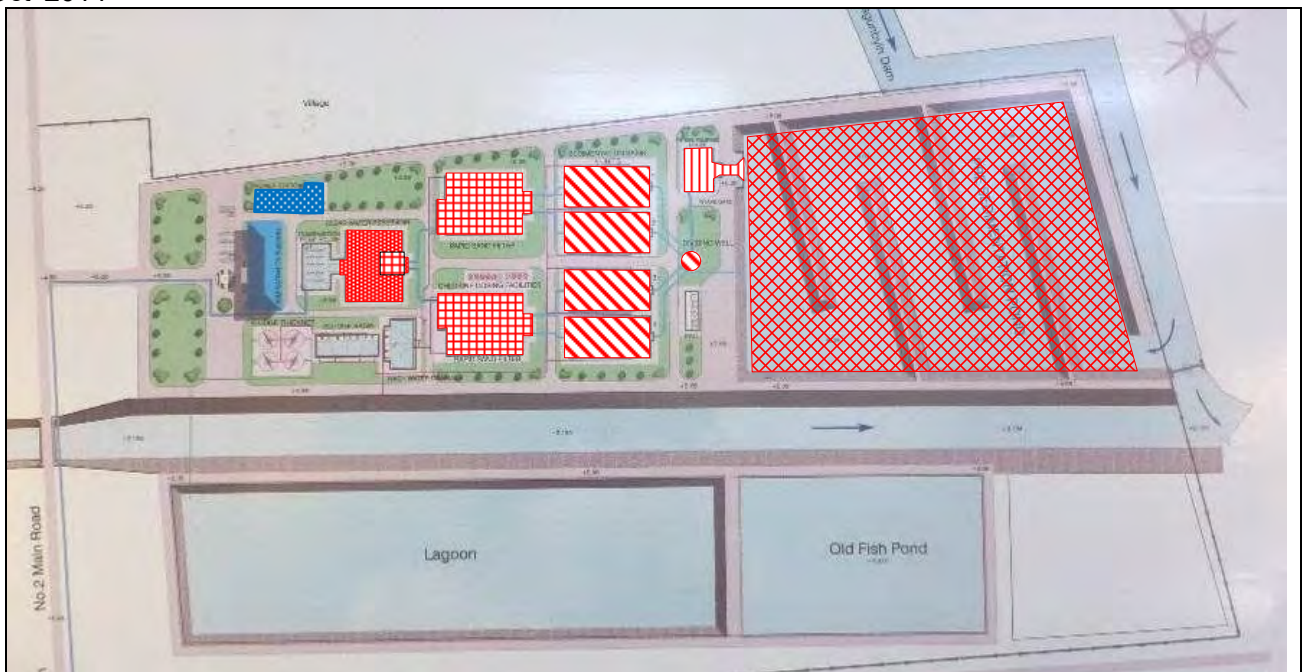


Status: ■ Under Construction (▨ Piles, ▨ Basement, ▨ Walls, ▨ Roofs) and ■ Completion

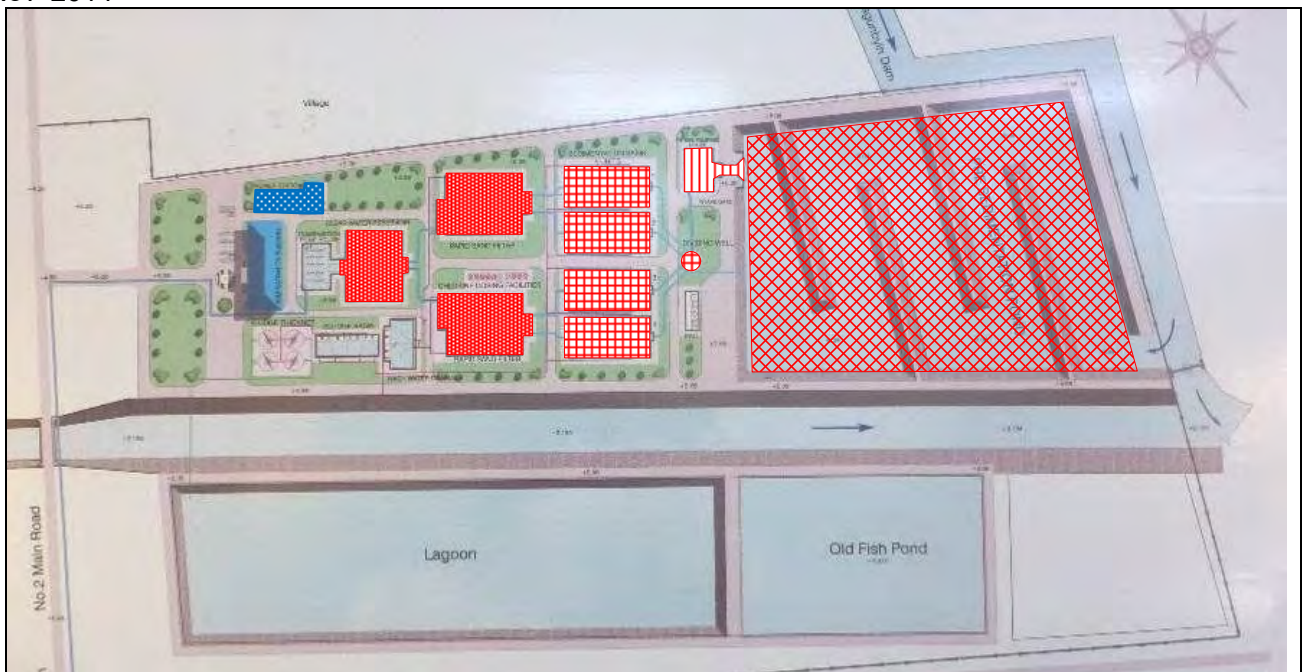
Sep 2014



Oct 2014



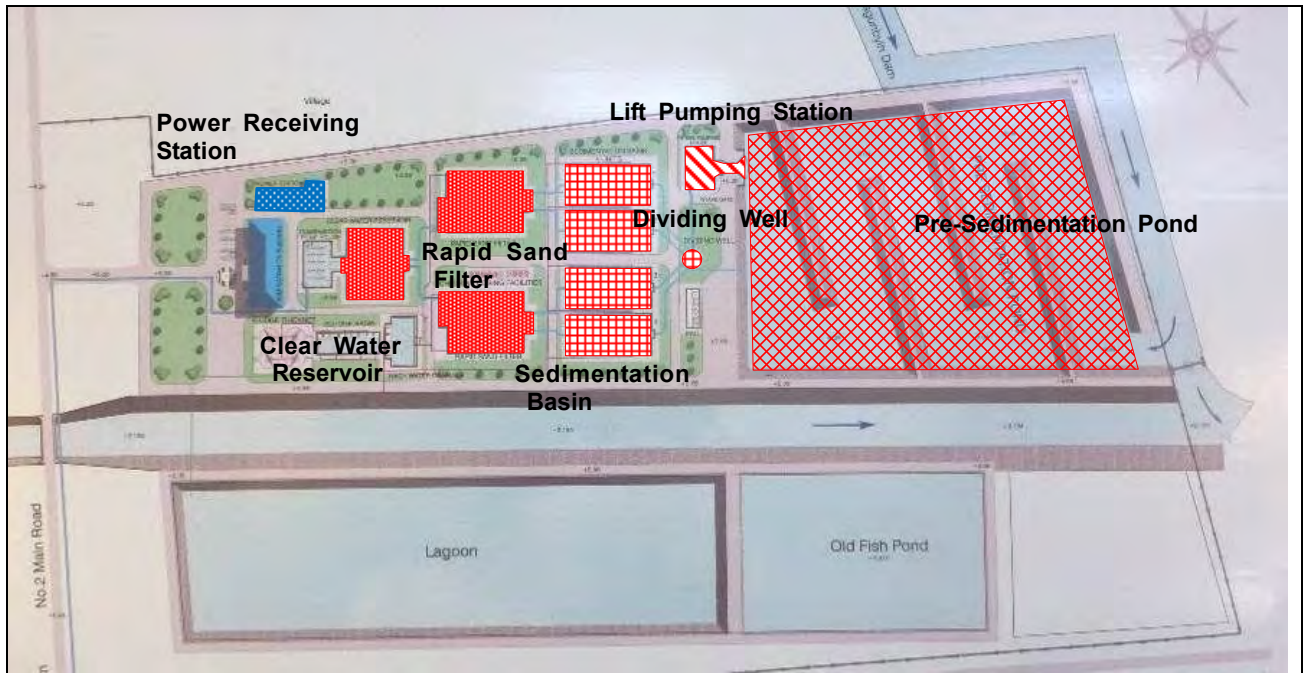
Nov 2014



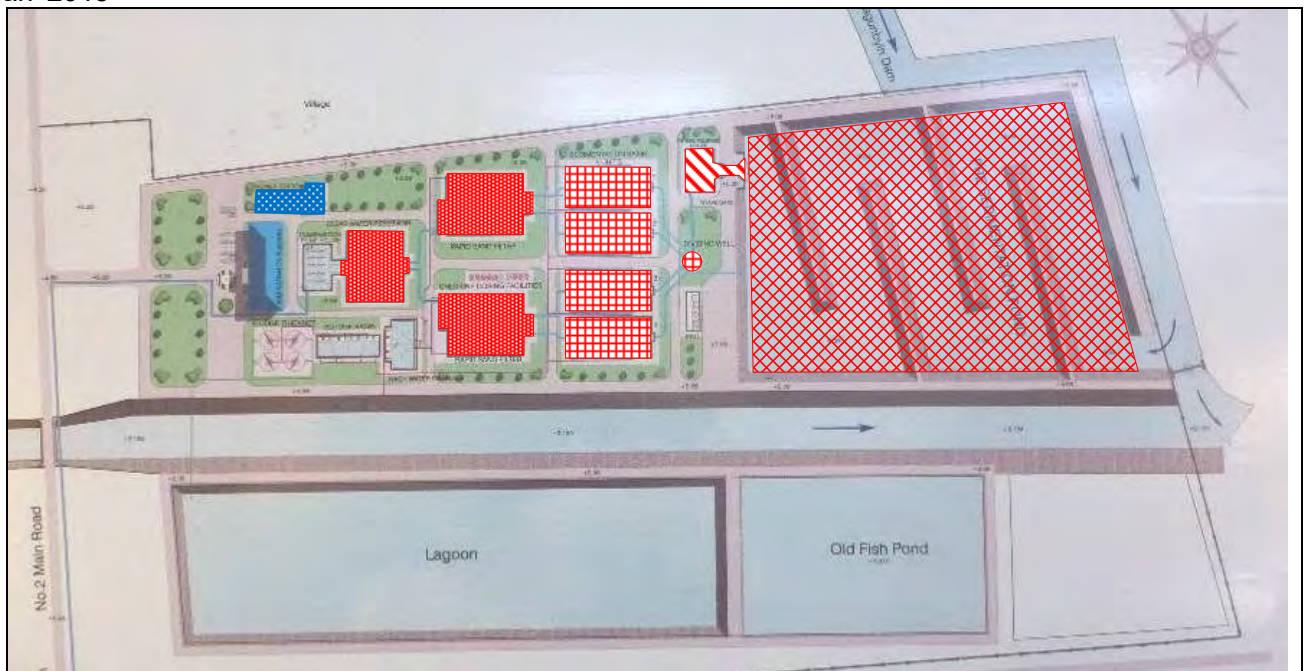


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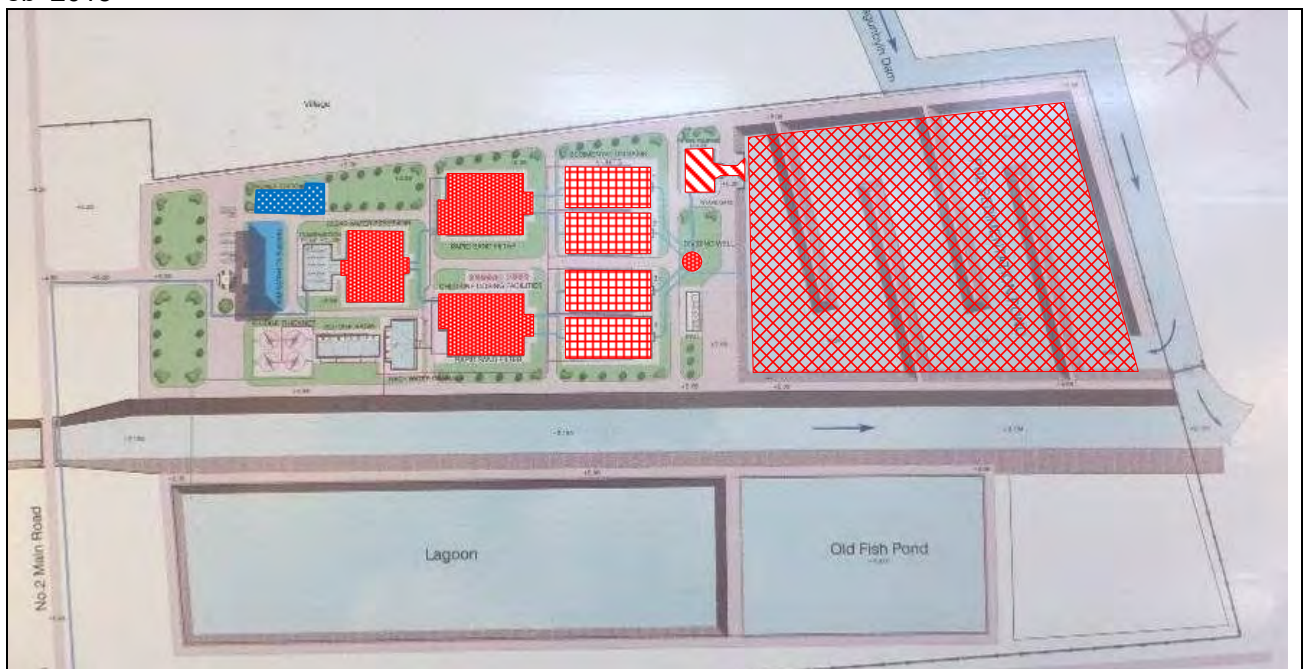
Dec 2014



Jan 2015



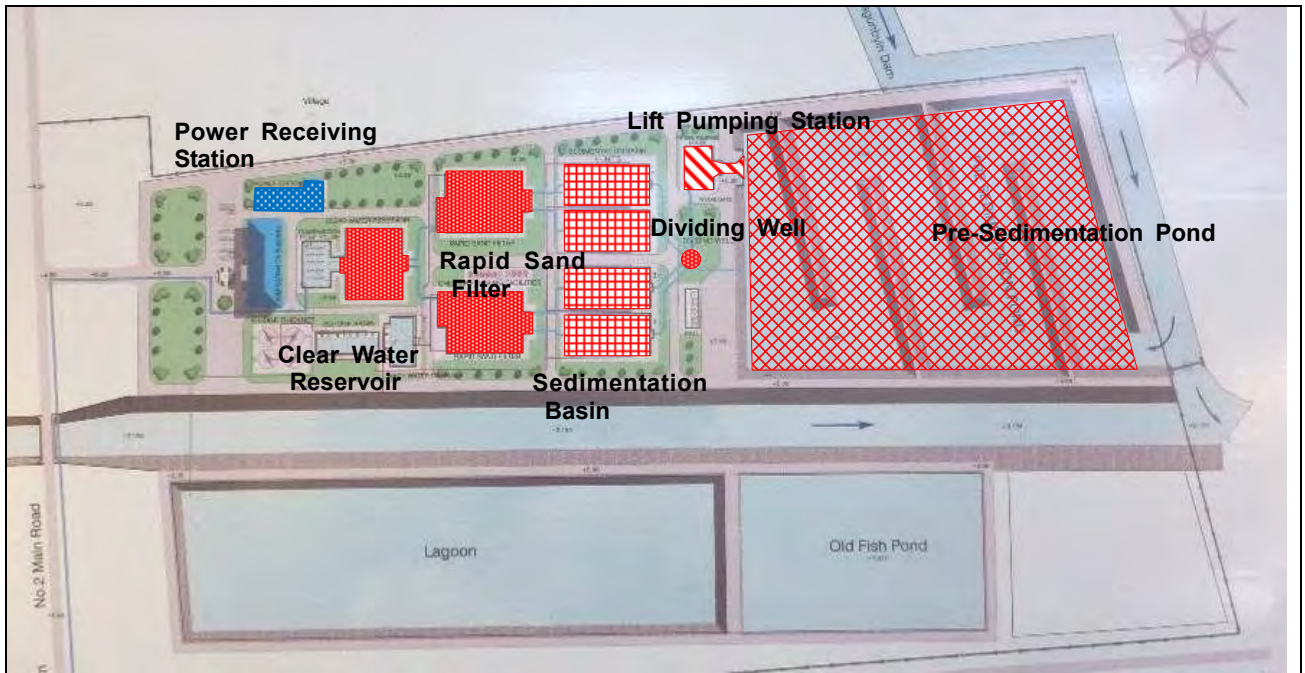
Feb 2015



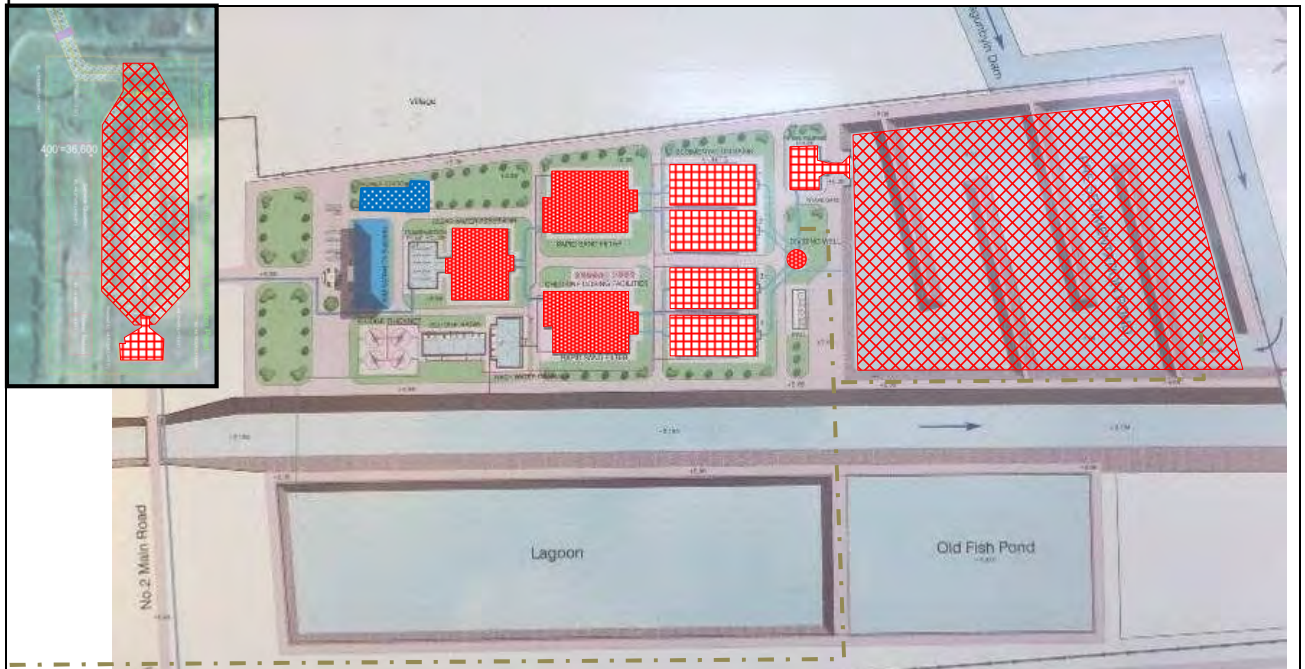


Status: ■ Under Construction (▨ Piles, ▨ Basement, ▨ Walls, ▨ Roofs) and ■ Completion

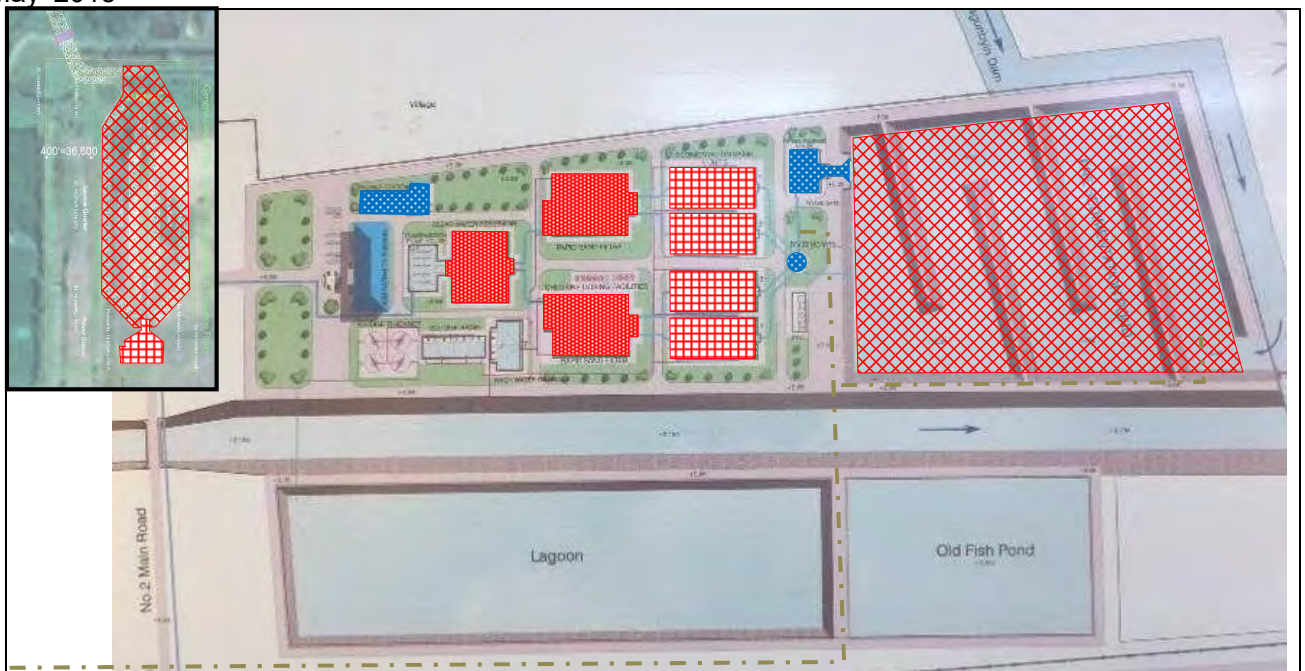
March 2015



April 2015

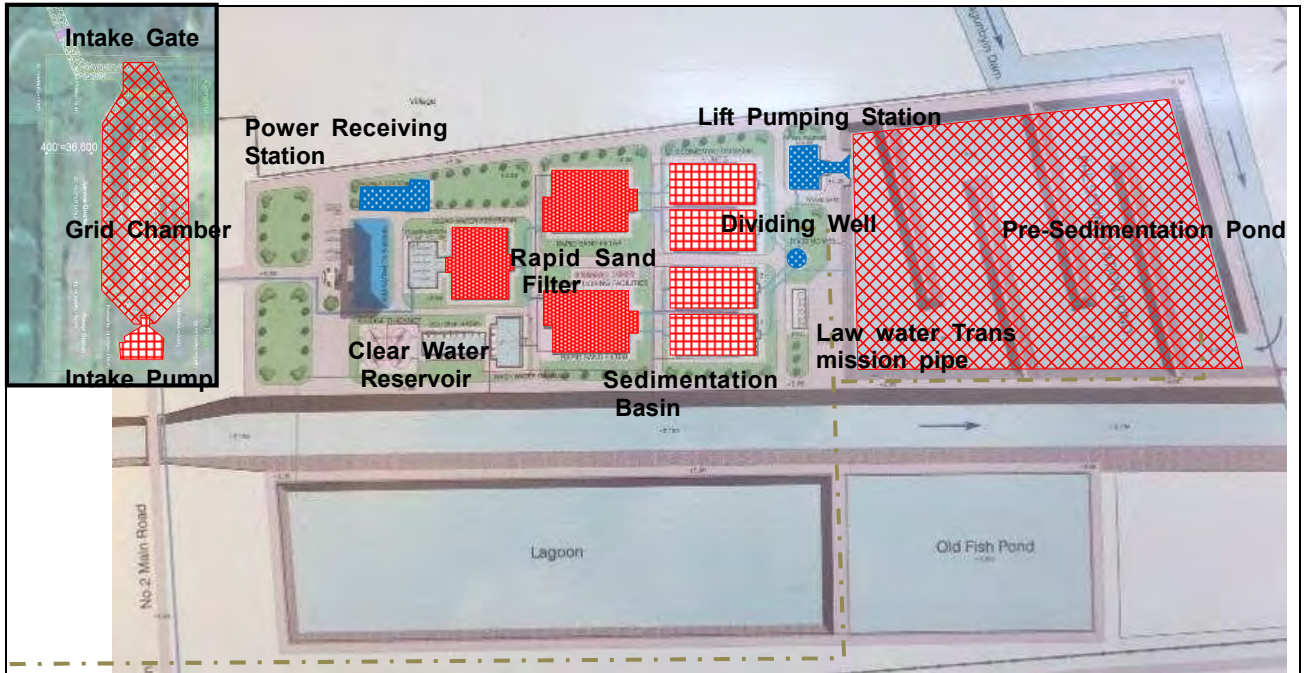


May 2015

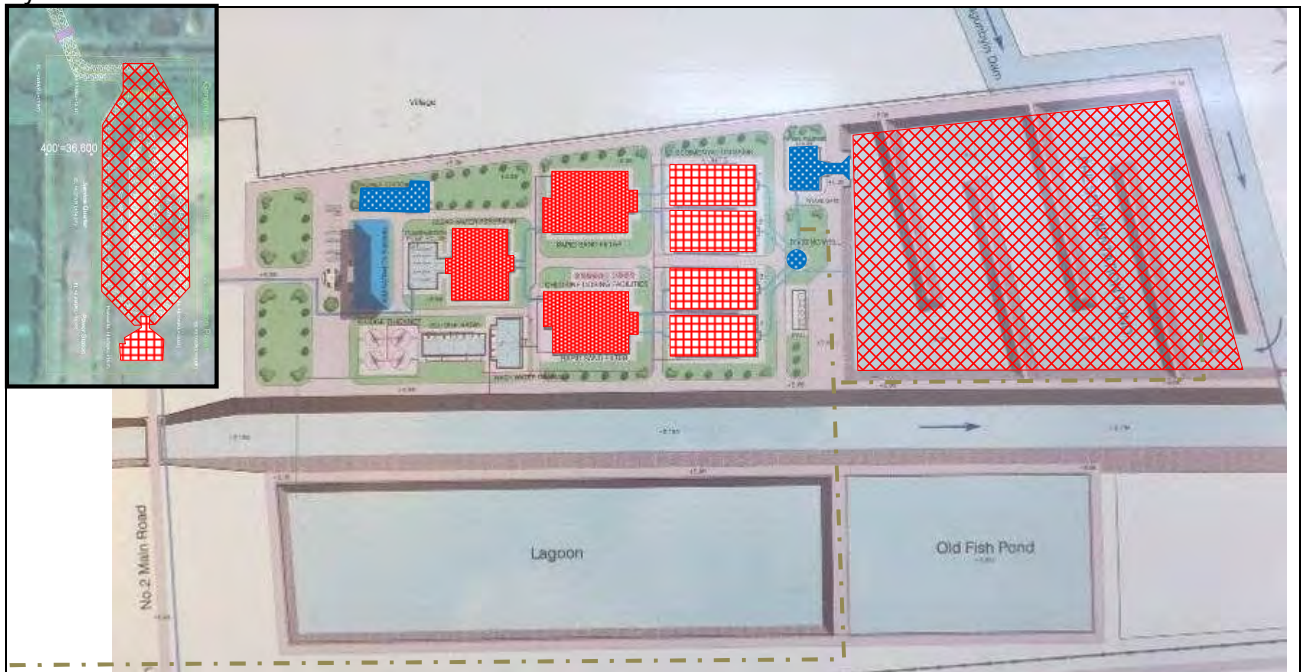




June 2015



July 2015



Aug 2015





Sep 2015



Oct 2015

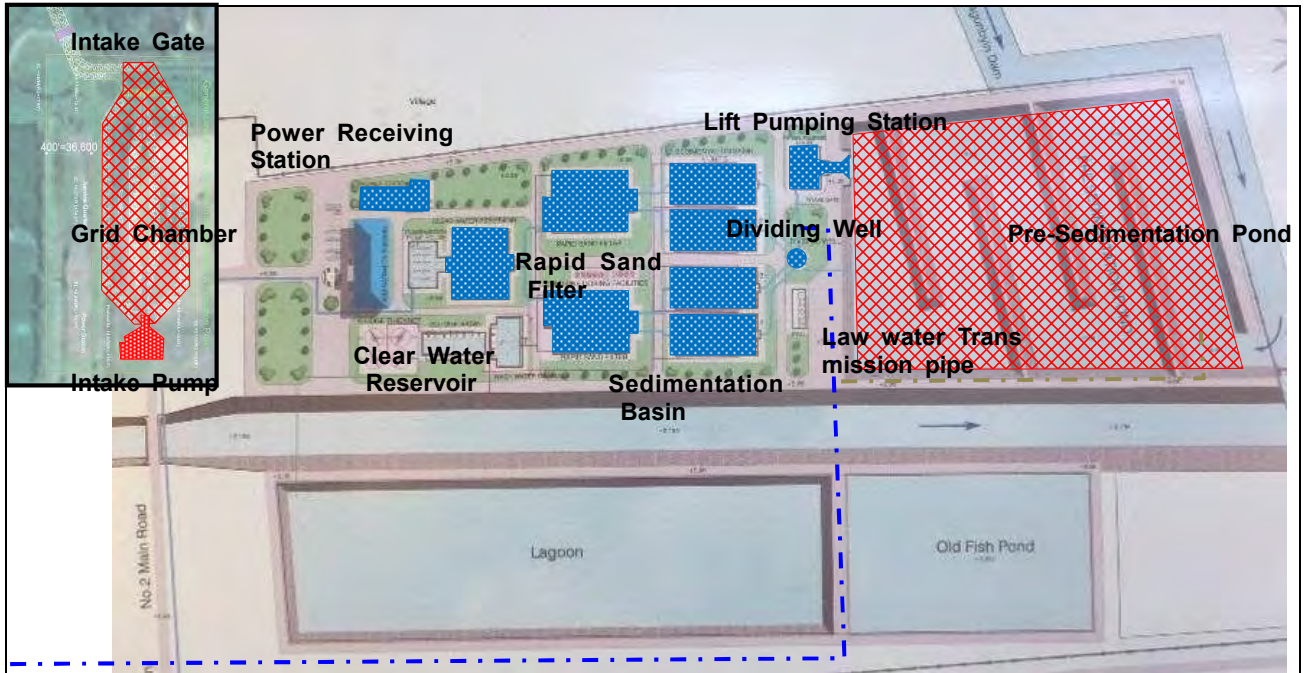


Nov 2015

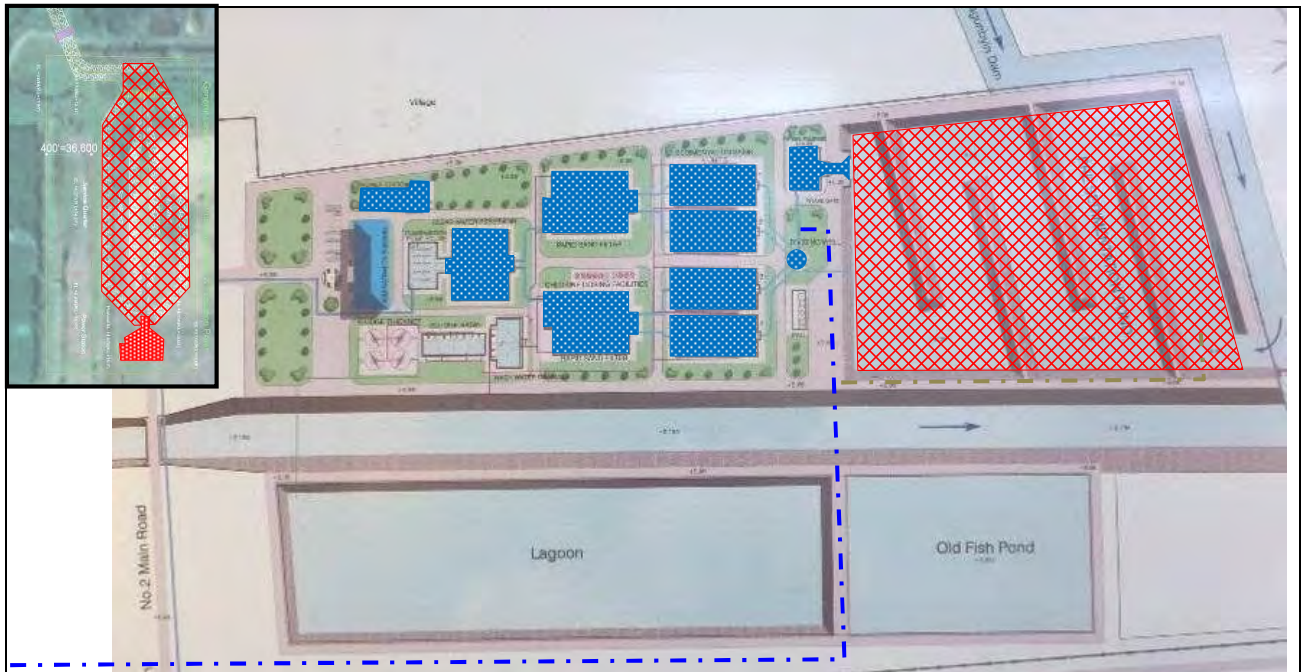




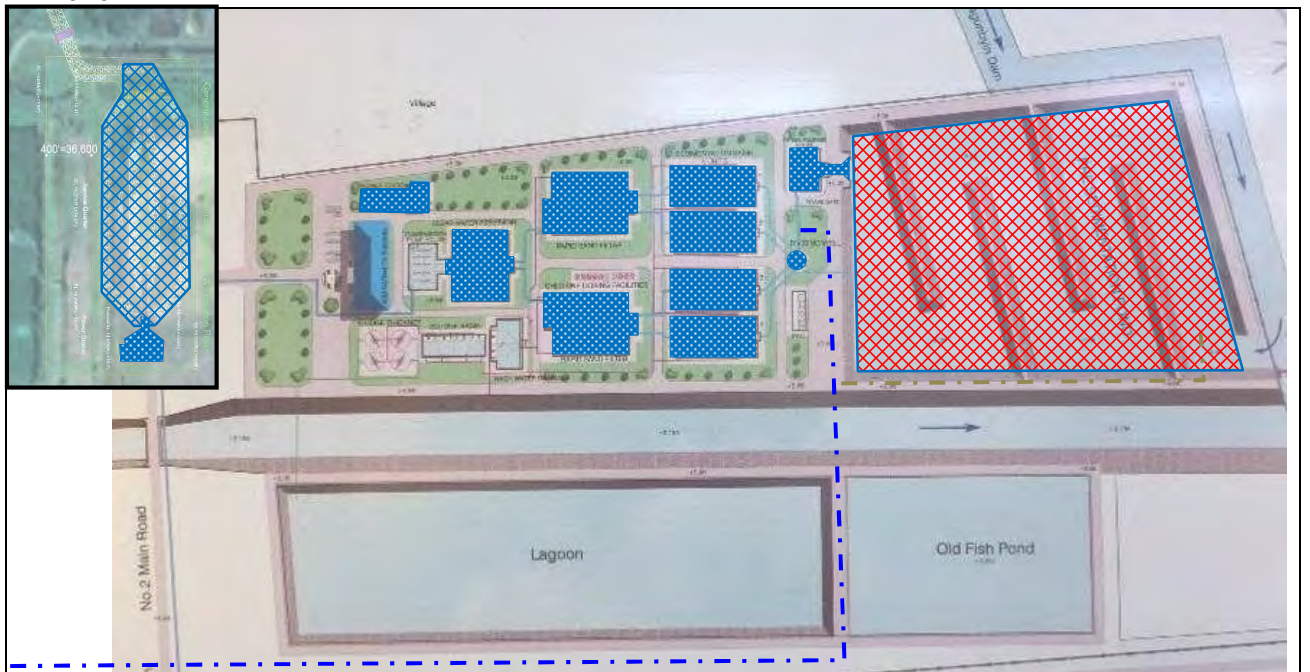
Dec 2015



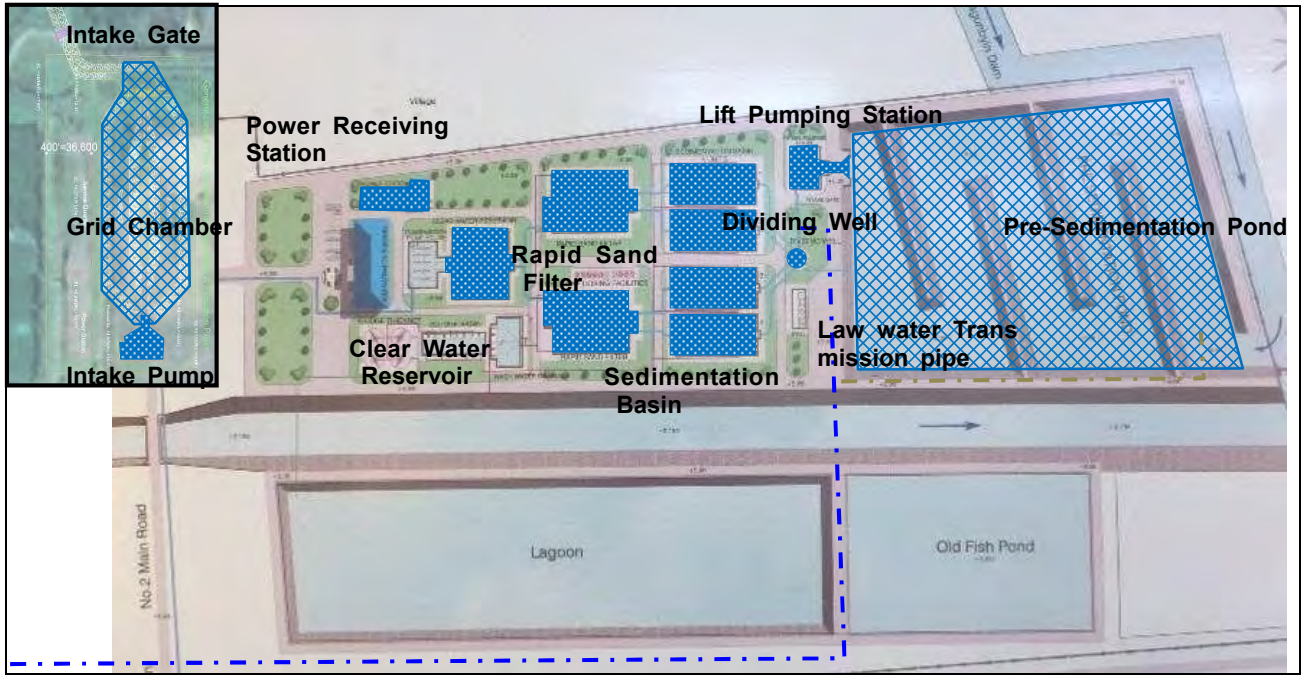
Jan 2016



Feb 2016



March 2016





**Intake Facility**

	
<p>Candidate Site in Riverbank of Ngamoeik Creek, 18 Sep. 2014</p>	<p>Decided Site of Intake Facility, 09 Dec. 2014</p>
	
<p>Grit chamber, 04 Feb 2015</p>	<p>Grit chamber, 27 Feb 2015</p>
	
<p>Grit chamber, 31 March 2015</p>	<p>Description panel, 28 April 2015</p>
	
<p>Grit chamber, 28 April 2015</p>	<p>Grit chamber, 02 June 2015</p>
	
<p>Grit chamber, 02 July 2015</p>	<p>Intake gate, 16 July 2015</p>





Grit chamber, 04 Sep. 2015



Intake gate, 04 Sep. 2015



Intake gate, 29 Sep. 2015



Intake gate, 05 Jan. 2015



Grit chamber, 29 Jan. 2015



Grit chamber, 29 Feb. 2015



Grit chamber, 29 March 2016



Grit chamber, 09 June 2016



Grit chamber, 28 Sep. 2016



Grit chamber, 03 Jan. 2017



**Intake Pumping Station**

<p>31 March 2015</p>	<p>28 April 2015</p>
<p>02 June 2015</p>	<p>02 July 2015</p>
<p>04 Sep. 2015</p>	<p>29 Sep. 2015</p>
<p>20 Oct. 2015</p>	<p>29 Jan. 2015</p>
<p>29 Feb. 2015</p>	<p>03 March 2016</p>





29 March 2016



11 May 2016



09 March 2017



21 March 2017



31 March 2017



18 April 2017



26 April 2017



Incoming panel, 28 May 2017



01 June 2017



28 July 2017





Incoming panel, 07 Sep. 2017



Incoming panel/ Control panel, 29 Sep. 2017



17 Oct. 2017



Control panel, 27 Oct. 2017



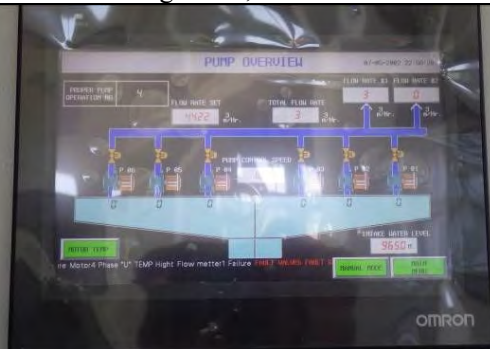
Control panel, 21 Jan. 2017



Wiring work, 21 Jan. 2017



Wiring work, 27 Feb. 2017



Check of control program, 11 Jan. 2018



Check of control program, 14 Feb. 2018



Operation Training, 07 March 2018



Raw Water Transmission Pipelines

	
<p>28 April 2015</p>	<p>Ductile iron pipe, 28 April 2015</p>
	
<p>Polyethylene pipe, 02 June 2015</p>	<p>02 June 2015</p>
	
<p>09 July 2015</p>	<p>16 July 2015</p>
	
<p>04 Sep. 2015</p>	<p>05 Oct. 2015</p>
	
<p>11 Jan. 2015</p>	<p>01 Feb. 2015</p>





1Feb.29日2015



Jan.26日2016



26 Jan. 2016



Railway crossing, 03 March 2016



Railway crossing, 05 April 2016



09 June 2016



Flowmeter chamber, 21 Feb. 2017



Flowmeter chamber, 09 March 2017

**Pre-Sedimentation Pond**

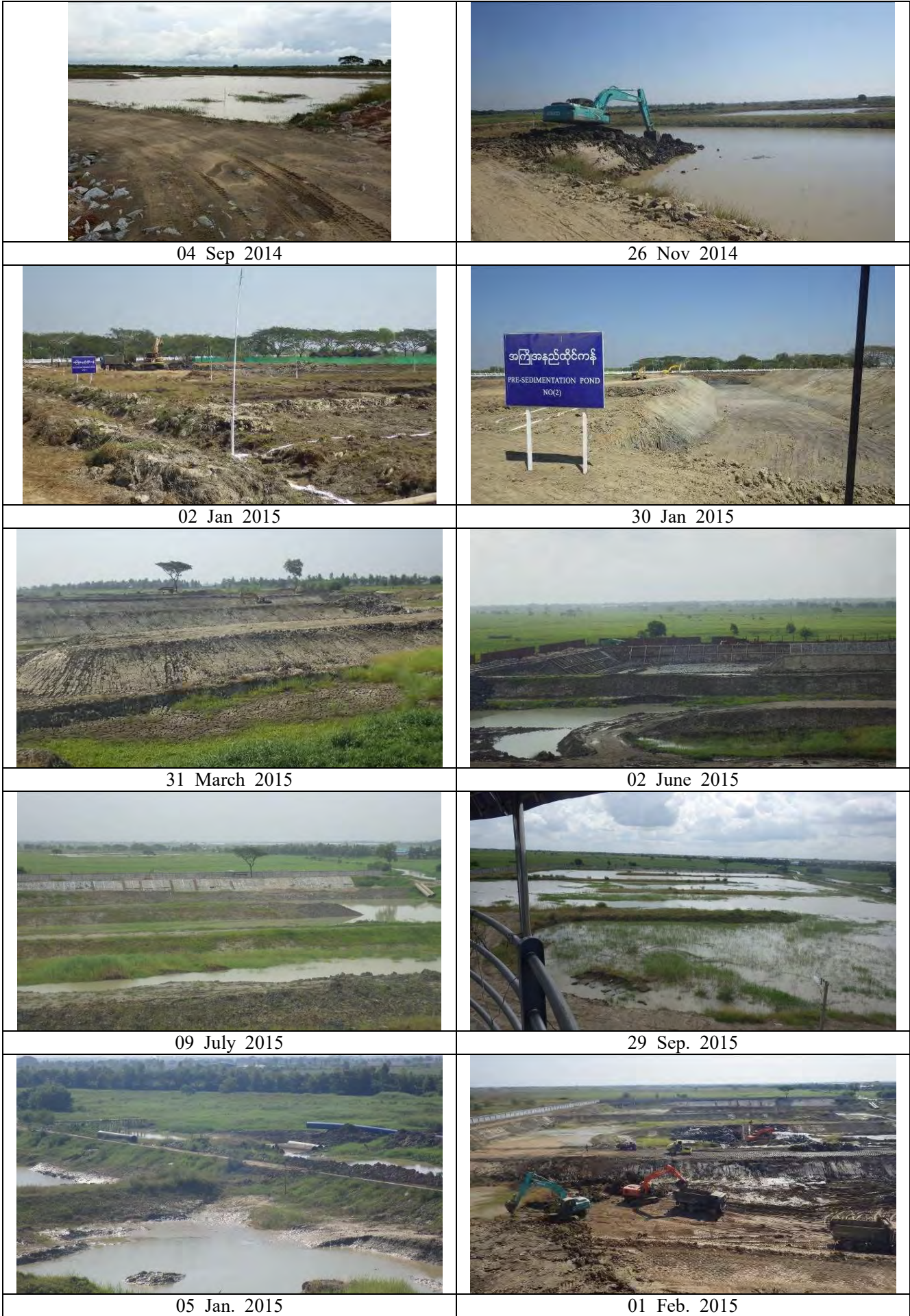


26 Mar 2014



07 July 2014









**Lift Pumping Station**







22 Sep 2014



26 Nov 2014



09 Jan 2015



30 Jan 2015



04 Feb 2015



27 Feb 2015



31 March 2015



31 March 2015



28 April 2015



02 June 2015





09 July 2015



16 July 2015



04 Sep. 2015



04 Sep. 2015



29 Sep. 2015



05 Jan. 2015



01 Feb. 2015



26 Jan. 2016



03 March 2016



29 March 2016





29 April 2016



09 June 2016



09 June 2016



24 Aug. 2016



29 Jan. 2016



03 Jan. 2017

### Dividing Well



02 March 2014



28 April 2014



31 Oct. 2014



26 Nov. 2014





09 Jan. 2015



30 Jan. 2015



28 April 2015



02 June 2015



09 July 2015



29 Sep. 2015



29 Feb. 2015



26 Jan. 2016



28 Sep. 2016



04 Jan. 2016





22 Jan. 2016



24 Jan. 2017

**ACH Dosing House**



22 Jan. 2018



23 Feb. 2018

**Sedimentation Basins**



26 March 2014



22 May 2014



07 July 2014



10 July 2014



25 Sep. 2014



31 Oct. 2014





26 Nov. 2014



02 Jan. 2015



02 Jan. 2015



04 Feb. 2015



04 Feb. 2015



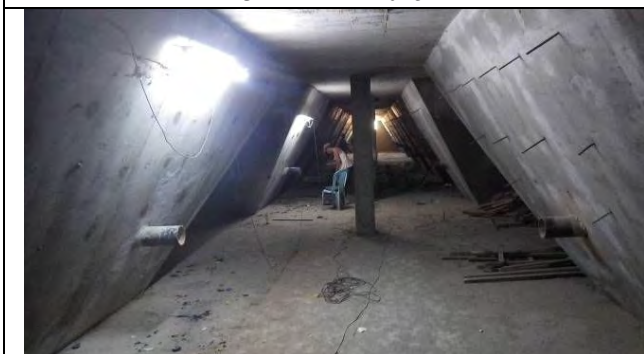
27 Feb. 2015



31 March 2015



31 March 2015



31 March 2015



28 April 2015





28 April 2015



28 April 2015



02 June 2015



02 June 2015



09 July 2015



16 July 2015



04 Sep. 2015



04 Sep. 2015



29 Sep. 2015



29 Sep. 2015





05 Jan. 2015



Tube settler, 08 Jan. 2015



26 Jan. 2016



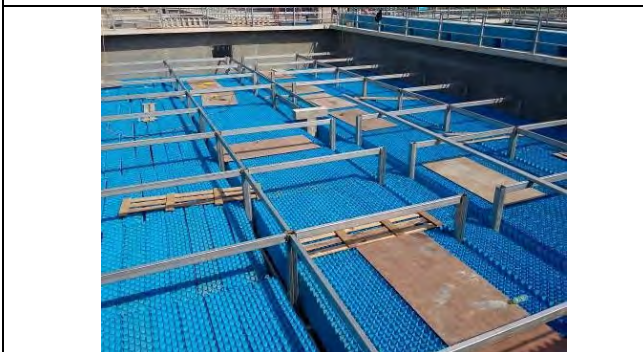
01 Feb. 2015



29 Feb. 2015



Tube settler, 03 March 2016



Tube settler, 05 April 2016



Trough, 29 April 2016



09 June 2016



07 July 2016

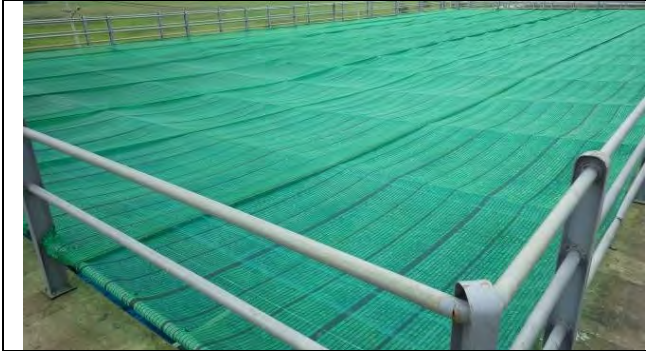




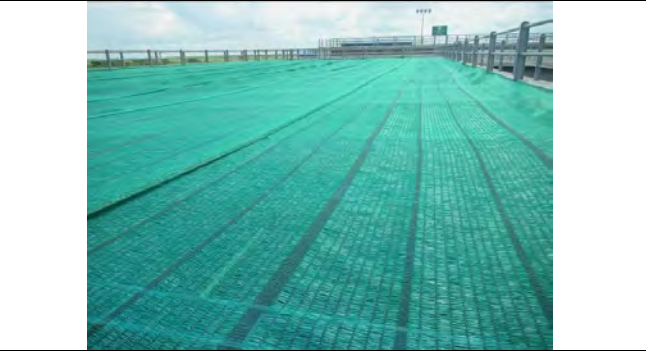
Trough, 07 July 2016



09 Aug. 2016



Light shielding sheet, 31 Aug. 2016



Light shielding sheet, 28 Sep. 2016



04 Jan. 2016



Inlet valve, 13 Oct. 2016



14 March 2017



01 June 2017



24 Aug. 2017



Remedial work of water leakage, 20 Sep. 2017





Remedial work of water leakage, 12 Oct. 2017



Remedial work of water leakage, 07 Jan. 2017



Remedial work of water leakage, 29 Jan. 2017



Remedial work of water leakage, 05 Feb. 2017

**Rapid Sand Filters**



26 March 2014



28 April 2014



16 May 2014



07 July 2014



04 Sep. 2014



25 Sep. 2014





31 Oct. 2014



02 Jan. 2015



02 Jan. 2015



04 Feb. 2015



17 Feb. 2015



27 Feb. 2015



31 March 2015



28 April 2015



28 April 2015



02 June 2015





02 June 2015



09 July 2015



02 July 2015



09 July 2015



16 July 2015



16 July 2015



21 Aug. 2015



21 Aug. 2015



05 Oct. 2015



29 Sep. 2015





20 Oct. 2015



28 Jan. 2015



29 Feb. 2015



08 Jan. 2015



26 Jan. 2016



26 Jan. 2016



03 March 2016



03 March 2016



05 April 2016



05 April 2016





29 April 2016



29 April 2016



29 April 2016



02 June 2016



Back wash pump and blower, 07 July 2016



Drain valve, 21 July 2016



Pipe route, 21 July 2016



Control panel, 21 July 2016



Back wash pump and blower, 28 Sep. 2016



28 Sep. 2016





Drain valve, 28 Sep. 2016



Sample of filtration sand, 13 Oct. 2016



22 Jan. 2016



29 Jan. 2016



Change of air pipe route, 03 Jan. 2017



07 Feb. 2016



02 Feb. 2017



21 Feb. 2017



Change of air pipe route, 21 Feb. 2017



Sieving of sand, 28 Feb. 2017





Sieving of sand, 28 Feb. 2017



Sieving of sand, 14 March 2017



Sample of filtration gravel, 31 March 2017



Sieving of sand, 21 March 2017



26 April 2017



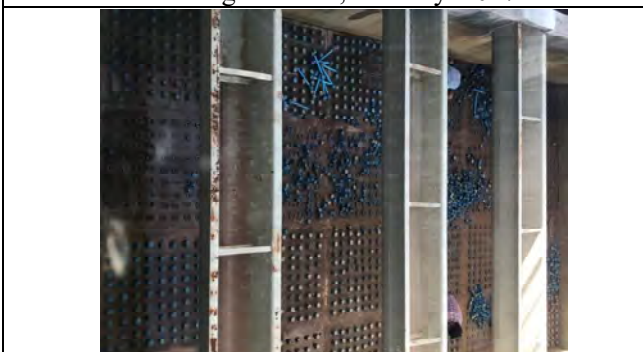
Sieving of sand, 18 May 2017



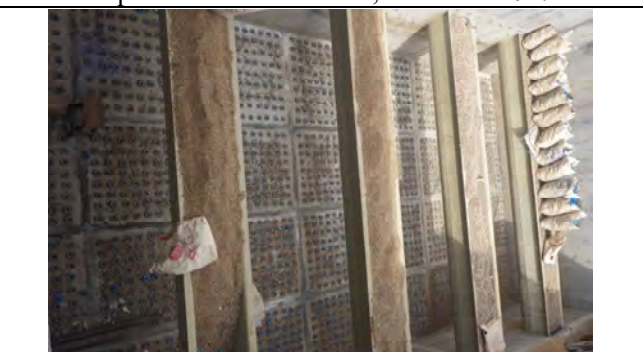
Sieving of sand, 11 July 2017



Improvement of strainer, 24 Oct. 2017



Improvement of strainer, 07 Jan. 2017



Improvement of strainer, 21 Jan. 2017





Improvement of strainer, 21 Jan. 2017



Sieving of sand, 12 Feb. 2017



05 Feb. 2017



Improvement of strainer, 02 Jan. 2017



02 Jan. 2017



Test of back washing, 17 Jan. 2018



Sieving of sand, 12 Jan. 2018



Sieving of sand, 23 Feb. 2018



Sieving of sand, 19 April 2018



Sieving of sand, 19 April 2018





19 April 2018



19 April 2018

### Clear Water Reservoir



26 March 2014



28 April 2014



22 May 2014



07 July 2014



04 Sep. 2014



31 Oct. 2014



26 Nov. 2014



09 Jan. 2015





30 Jan. 2015



17 Feb. 2015



31 March 2015



28 April 2015



Explanation of chlorination, 28 April 2015



02 June 2015



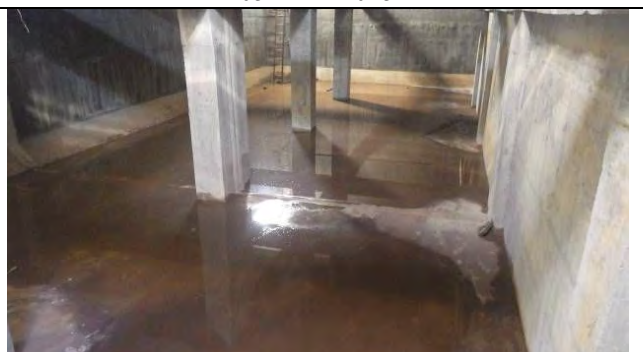
16 July 2015



05 Jan. 2015



28 Jan. 2015



29 Feb. 2015








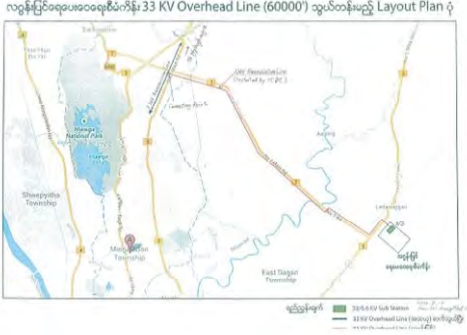



**Wash Water Tank**







**Power Receiving Station**

	
<p>26 March 2014</p>	<p>26 March 2014</p>
	
<p>28 April 2014</p>	<p>28 April 2014</p>
	
<p>07 July 2014</p>	<p>25 July 2014</p>
	
<p>Incoming line of 33Kv Transmission, 15 Aug. 2014</p>	<p>The branch point along the Route No. 3, 15 Aug. 2014</p>

**Others**

	
<p>Benchmark in the WTP, 02 May 2014</p>	<p>Below Base Course of Service road, 28 Apr 2014</p>





Flange Gasket, 02 May 2014



Strainer of Existing WTP, 02 May 2014



Service road, 02 June 2015



Removal of temporary material, 05 Oct. 2015



Service road, 26 May 2016



Drainage ditch, 25 Aug. 2016



Drainage ditch, 28 Sep.2 2016



Drainage ditch, 21 Feb. 2017



Drainage ditch, 21 March 2017



Drainage ditch, 26 April 2017