Project Design Matrix

Project Title: The Project for Capacity Development of Road and Bridge Technology
道路橋梁技術能力強化プロジェクト

Version 0.0
Dated March 30, 2015

Implementing Agency: PW （Public Works), MOC
Target Group: Bridge Department, Road Department
Period of Project: 3.5 years (including 0.5 year for preparation)
Project Site: Nay Pyi Taw and whole country of Myanmar
Model Site:

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Quality of bridges and concrete structures constructed or managed by PW improved	（Within 5 years after the project completes, ） 1. At least XX% of the bridges and concrete structures constructed complying the technical documents 2. The strength, and appearance of the concrete structure built by PW is maintained within the requirements stipulated in the technical documents.	List and record of bridges and road constructed Record of bridge post completion inspection	PW continues to revise and update the technical documents PW support promotion and dissemination of the technical documents to construction engineers in Myanmar		
Project Purpose The capacity of PW engineers on construction management for bridge and road construction enhanced	（Upon completion of the Project, ） 1. The technical documents are distributed and ready to be used to all PW offices. 2. The technical documents are used and applied by the state and regional offices of PW where the pilot projects have been carried out. 3. The maintenance records of bridges constructed through the pilot projects are submitted to the PW headquarters for monitoring.	1-1 Observation by C/P and the experts 1-2 Record of project supervision 1-3 Interview to engineers participated in the workshops/ seminars 2-1 Observation by C/P and the experts 2-2 Record of project supervision 2-3 Interview to engineers participated in the workshops/ seminars 3-1 maintenance record 3-2 Observation by C/P and experts	The current policy on quality assurance for construction remain unchanged. Quality assurance activities carried out continuously after the project completes		

Outputs Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided	1-1 The advises and the recommendations to PW are practical and provided in a timely manner 1-2 PW increases the knowledge on selected policies and technical documents on road and bridges.	1-1 Activity reports, reports submitted to PW, interview to C/P 1-2 List of technical documents introduced, results of post-seminar evaluation	Sufficient and accurate testing services for quality control are available in a timely manner		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced	2-1 The draft of the work process on quality and safety control for concrete and bridge construction completed, submitted 2-2 Trainings on work process for quality and safety control of concrete and bridge construction are carried out	2-1 Draft of the work process, interviews to PW, samples of the bridge inventory 2-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Sufficient budget for activities to ensure quality and safety control is allocated Organizational arrangement for implementation remains no significant changes		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed	3-1 The draft technical documents are completed, submitted and reviewed 3-2 Trainings on construction management for quality and safety control of concrete and bridge construction are carried out	3-1 Draft of the technical documents interview to PW 3-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Training carried out regularly and continuously by the Myanmar side		

Activities	Inputs		Pre-Conditions
	The Japanese Side	The Myanmar Side	
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc. 1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected. 1-3 Propose prospective Japanese technical assistance for the road and bridge sectors. 1-4 Introduce Japanese technical documents through seminars.	1. Experts (1) Long-term Experts Road / Bridge Policy Advisor Construction Management / Monitoring and Evaluation / Coordinator (2) Short-term Experts Quality control (Concrete) Quality control (Steel bridge) Quality control (PC bridge) Quality control (Foundation) Safety control Bridge Inventory / Work Process (3) Lecturers of the Seminars 2. Training in Japan 3 times (1 time / year)	1. Counterpart (1) Project Director General (2) Project Director (3) Project Manager (4) Counterpart Team Bridge Department, PW Road Department, PW 2. Equipment and Facilities (1) Office space in the building of PW's HQ for the Road/Bridge Policy Advisor with office furniture and utilities such as internet connection, electricity, air conditioner etc. (2) Office space in the building of PW's HQ for other Project members with office furniture and utilities such as internet connection, electricity, air conditioner etc. 3. Local Cost Borne by the Myanmar Side (1) Trainees' and Participants' expenses of workshops/ seminars, trainings in Myanmar including travel expenses, allowance etc. (2) Construction cost of the Pilot Project(s) 4. TAG (1) Expenses of Myanmar side of TAG which is regularly held to invite relevant organizations, such as BRL, RRL, YCDC, YTU etc.	Sufficient number of counterparts with appropriate expertise are assigned to the Project
2-1 Investigate the current condition of the overall capacity and the work process in PW. 2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings. 2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project. 2-4 Develop the bridge inventory (system flamework and sample database) to keep documents and data necessary for maintenance. 2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes. 2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects. 2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars. 2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.			
3-1 Investigate the current condition of the existing technical documents of PW. 3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings. 3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction). 3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s). 3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars. 3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.			

Tentative Plan of Operation

Project Title: The Project for Capacity Development of Road and Bridge Technology

Activities / Sub-Activities	Year	1st Year				2nd Year				3rd Year				4th Year			
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided																	
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc.	Plan																
	Actual																
1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected.	Plan																
	Actual																
1-3 Propose prospective Japanese technical assistance for the road and bridge sectors.	Plan																
	Actual																
1-4 Introduce Japanese technical documents through seminars.	Plan																
	Actual																
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced																	
2-1 Investigate the current condition of the overall capacity and the work process in PW.	Plan																
	Actual																
2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.	Plan																
	Actual																
2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.	Plan																
	Actual																
2-4 Develop the bridge inventory (system flamework and sample database) to keep documents and data necessary for maintenance.	Plan																
	Actual																
2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes.	Plan																
	Actual																
2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.	Plan																
	Actual																
2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars.	Plan																
	Actual																
2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	Plan																
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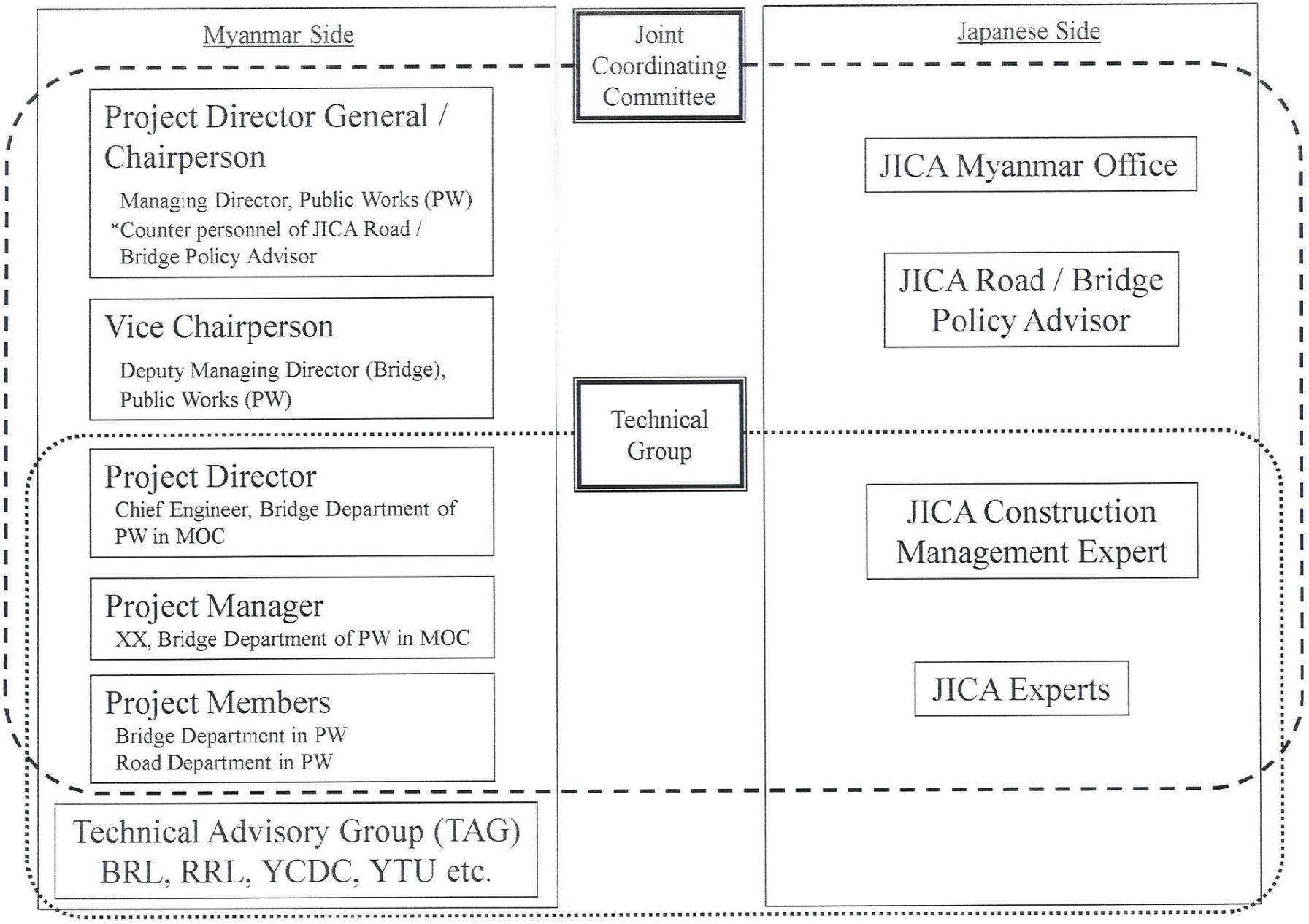
	Actual																
3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction).	Plan																
	Actual																
3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).	Plan																
	Actual																
3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars.	Plan																
	Actual																
3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	Plan																
	Actual																
Duration / Phasing	Plan	Preparation															
	Actual																

Annex 3

Organization chart of the Project



LIST OF PROPOSED MEMBERS OF JOINT COORDINATING COMMITTEE

Chairperson: Managing Director, Public Works (PW), Ministry of Construction (MOC)

Vice Chairperson: Deputy Managing Director, PW, MOC

Members:

(1) Myanmar Side

1) Project Director: Chief engineer, PW, MOC
2) Project Manager: XX(Name), XX(Position), PW, MOC
3) Bridge Department:
   - XX (Name), XX (Position), PW, MOC
   - XX (Name), XX (Position), PW, MOC
   - XX (Name), XX (Position), PW, MOC
   - XX (Name), XX (Position), PW, MOC
4) Road Department:
   - XX (Name), XX (Position), PW, MOC
5) Relevant personnel accepted by the Chairperson, if necessary.

(2) Japanese Side

1) JICA Myanmar Office
   - Chief Representative
   - Representative
   - Program Officer in charge of the Project
2) JICA Experts (Long-term)
   - Road / Bridge Policy Advisor
   - Construction Management / Monitoring and Evaluation / Coordinator
3) JICA Experts (Short-term
   - Quality Control (Concrete)
   - Quality Control (Steel Bridge)
   - Quality Control (PC Bridge)
   - Quality Control (Foundation)
   - Safety Control
   - Bridge Inventory / Work Process
4) Other personnel accepted by JICA, if necessary

JCC will be scheduled based on the maximum availability of the members listed above.

MAIN POINTS DISCUSSED

1. MAIN CONTENTS OF THE PROJECT

The JICA Mission proposed and both sides agreed that the main contents of the Project include (1) advisory on policies and technical documents of the road and bridge sectors, (2) work process for quality and safety control of concrete and bridge construction, and (3) technical documents on quality and safety control of road and bridge construction.

2. PROJECT TITLE

Both sides confirmed that the Project title is "The Project for Capacity Development of Road and Bridge Technology".

3. PROJECT DESIGN MATRTX (PDM)

Both sides agreed on the contents of the tentative Logical Framework (Project Design Matrix: PDM) and the tentative Plan of Operation (PO) as shown in Annex 1 and 2 of the draft R/D. The PDM and PO are to be flexibly revised according to the progress and the achievement of the Project, upon mutual agreement between PW and JICA by signing a Minutes of Meetings, according to the draft R/D.

4. COUNTERPART

Both sides agreed that necessary counterparts as described in II.5 (2) and Annex-1 (PDM) of the draft R/D shall be assigned and informed to JICA before the signing of the R/D, and at least one of the counterparts from the bridge department and the road department respectively shall be dedicated to the Project.

5. PROJECT OFFICES

Both sides agreed necessary two (2) office spaces as described in II.1 (2) and Annex-1 (PDM) of the draft R/D shall be prepared by PW in the building of PW's HQ including office furniture and utilities such as internet connection, electricity, air conditioner etc. before commencement of the Project. The arrangement plan will be informed to JICA before the signing of the R/D. An estimated number of members to be accommodated is approximately two (2) for office of the road / bridge policy advisor and twenty (20) for office of other Project members.

6. TRANSLATION OF TECHNICAL DOCUMENTS INTO MYANMAR LANGUAGE

PW requested to the JICA Mission, the technical documents of 1) Quality control of Bridge, 2) Quality Control of Concrete and 3) Safety Control as the output of the Project will be translated into Myanmar Language (Burmese).

Basically the JICA Mission agreed to it, however the outputs of the Project shall be the English version and Burmese version shall be the reference for Myanmar engineers, because native check cannot be carried out by Japanese side. PW agreed to it.

7. INTRODUCTION OF OTHER JAPANESE TECHNICAL DOCUMENTS

PW requested to the JICA Mission, the Japanese technical documents of 1) Bridge Design, 2) Bridge Maintenance, 3) Quality Control of Soil Structures and 4) Quality Control of Pavement, will be translated into English and introduced to Myanmar engineers with seminar(s). The JICA Mission basically agreed to it.

8. IMPREMENTATION OF ON-THE-JOB-TRAINING

Both sides agreed that on-the-job training(s) of construction management of bridges and concrete structures will be carried out at selected pilot project(s)' site in the Project, and the schedule of the on-the-job training(s) and the selection of the pilot project(s) will be decided through the mutual consultation by both sides.

And also both sides agreed that the construction cost and the local expenses such as travel expenses and daily allowance for PW engineers etc. and overall responsibility for the on-the-job training(s) shall be borne by the Myanmar side and PW shall prepare enough budget for the on-the-job training(s).

In addition, the JICA mission team requested that the pilot project(s) sites shall be selected from areas where safety for Japanese experts is secured.

9. TECHNICAL ADVISORY GROUP (TAG)

Both sides agreed that the Technical Advisory Group (TAG) will be held regularly during the Project at least once a year to report the progress of the Project, technical findings and ask opinions from relevant organizations such as Bridge Research Laboratory (BRL), Road Research Laboratory (RRL), Yangon City Development Committee (YCDC) and Yangon Technological University (YTU) and private companies, etc.

And both sides confirmed necessary local expenses such as travel expenses and daily allowance for the members of TAG from PW shall be borne by the Myanmar side.

The members from other organizations may participate to TAG on their own

expenses.

10. TAX OR LEVY

Both sides confirmed that in case any tax or levy is imposed for equipment provided by Japanese side, PW shall be borne the equivalent amount of the tax or levy on import. The Myanmar side explained the new tax regulation imposed to salary paid to foreign experts. JICA took the issue into consideration.

The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

MINUTES OF MEETING ON 1st JOINT COORDINATION COMMITTEE (JCC) MEETING

17 November, 2016

1st Joint Coordination Committee (hereinafter referred to as "JCC") Meeting on the Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar (hereinafter referred to as "the Project") was held on 8th November 2016 with attendance of major project counterparts representing the Ministry of Construction (MOC), representatives of JICA and experts of the JICA Project Team to share the information on progress and achievement of the Project based on the Progress Report and the Monitoring Sheet submitted by JICA Project Team in advance.
As a result of the discussions as shown in Appendix-1, the JCC member agreed on the Monitoring Sheet with revision of the Project Design Matrix (PDM), and on the proposal for Schedule of Stage-2 based on the Baseline Survey.

Chair Person

U Kyaw Linn
Permanent Secretary
Ministry of Construction,
Myanmar

JICA

Akihito SANJO
Senior Representative
Japan International Cooperation Agency,
Myanmar Office

Project Director

U Shwe Lay
Deputy Director General
Department of Bridge
Ministry of Construction, Myanmar

JICA Project Team

Akira MITSUISHI
Road / Bridge Policy Advisor
Japan International Cooperation Agency

Appendix-1: Details of the Meeting

1. Opening Remarks

Excellency U Win Khaing (Union Minister of Construction) stated current situation in road and bridge construction and importance of quality and safety control at the beginning of the meeting. At the same time, he mentioned that construction management based on proper recording and monitoring system would be very useful for MOC in the future to achieve the Mind Shift towards Quality First. In addition, he expressed his concern about damage of road and bridge by flood due to climate change and overloaded vehicles.

Responding to above remarks, Mr. SANJO, Senior Representative of JICA Myanmar Office stated his remarks about appreciation to the Excellency for cooperation to the Project and significance of the Project with introduction of achievements by former technical cooperation projects conducted by JICA such as "Project for Bridge Engineering Technology Training Center (1970-1985)" and "The Project for Improvement of Road Technology in Disaster Affected Area (2012-2015)". Moreover he requested to MOC for effective utilization of the Project and aggressive participation to the training to achieve the purpose of the Project.

2. Introduction of Long Term Experts from JICA

Mr. Mitsuishi (Road / Bridge Policy Adviser) and Mr. Senoo (Construction Management/ Monitoring and Evaluation/ Coordinator) introduced themselves to announce their assignments.

3. Introduction of Core-Trainers

23 Core Trainers (CTs) for the Project were introduced by U Paing (Chief Engineer, Planning) with clarification on selection criteria of the CTs. 16 CTs out of 23 participated the JCC and they were also introduced by themselves with their eagerness to the Project. Mr. Mitsuishi requested U Paing to arrange interview meetings with all CTs for JICA Experts to arrange suitable training curriculum, and U Paing agreed with it.

4. Explanation of Project Design Matrix (PDM) and Project Monitoring Sheet (PMS)

(1) The PDM for the Project was explained by Mr. Mitsuishi to introduce the structure and contents of the PDM. In this connection, following revisions for "Objectively Verifiable Indicator" and "Means of Verification" on Overall Goal in the PDM were proposed. It was also explained that these revisions would be subject to be finalized by the next JCC Meeting through discussion.

Revised Item	Original	After Revision
Objectively Verifiable Indicator	"1. At least XX% of the bridges and concrete structures is constructed complying the technical documents.	All bridges and concrete structures are constructed after the end of this Project complying the technical documents."
Means of Verification	List and record of bridges and road constructed	List and record of bridges and road constructed as well as their complying technical documents.

(2) Progress of the Project was presented by Mr. Senoo based on PMS consist of "PM Form 3-1

Monitoring Sheet Summary", "PM Form 3-2 Project Design Matrix (PDM)" and "PM Form 3-3 Plan of Operation (PO)" to share the situation with JCC members. It was explained that Activities for Output-1 was just started from November 2016 by JICA Long-term Experts, and the Activities for Output-2&3 had been implemented on schedule by JICA Short-term Experts.

5. Result of Baseline Survey and Schedule of Stage-2

Mr. Okazaki (Team Leader of JICA Project Team) explained i) Outline of the Project, ii) Result of Baseline Survey and iii) Schedule of Stage-2 in accordance with hand out materials. Following outputs were presented to share the information on activities performed by the JICA Project Team and to explain the policy for development of the Quality and Safety Control Manual in Stage-2.

Item	Major Output
Part-I Project Outline	Purpose, Activity and Schedule of the Project
Part-II Result of Baseline Survey	
1. Construction Management and Workflow for Bridge Construction	Definition of Role and Responsibility in MOC, Systematic Monitoring System and Recording System will be introduced by means of the development of Guideline for Construction Management.
2. Concrete Structure	Field work and concrete mixing will be mainly focused to be improved by the Quality Control Manual.
3. PC (Pre-Stressed Concrete) Girder Bridge	Tensioning Operation and Grouting Test will be mainly improved by the Quality Control Manual. Basic Design Analysis for PC Girder will be also introduced through Work Shop in Stage-2.
4. Steel Bridge	Quality Control during Steel Bridge Fabrication shall be improved by means of shop inspection by DOB staff. Required measures to typical defects by design and/or technical specification issue will be introduced in the references to be attached to the Quality Control Manual.
5. Bridge Foundation	Quality Control for Bored Pile shall be first priority to be improved by the Project. Quality Control for PC Pile which can be alternative of the Bored Pile will be included in the Manual to be practiced during the Pilot Project during Stage-3.
6. Safety Control	The Safety Control Manual to be developed under the Project will be focused on i) Safety Planning, ii) Safety Measures and Organization, iii) Recording System, and vi) Role and Responsibility of each organization in Construction Safety. The Safety Control Manual will be practiced during the Pilot Project in Stage-3.
7. Bridge Inventory	Web based database system consists of inventory data, photo data, position data and document data will be developed under the Project. Trial operation of the database system will be started from April 2017.
Part III Schedule of Stage-II	Draft of the Quality and Safety Control Manual will be developed by the end of October 2017. Road and Bridge Technology Seminar is scheduled in March 2017. Two (2) times of Training in Japan are scheduled in May and October 2017 respectively.

6. Comments by JCC Members

(1) U Htay Win from YTU introduced on-going project for Development of a Comprehensive Disaster Resilience System and Collaboration Platform in Myanmar under the SATREPS (Science and Technology Research Partnership for Sustainable Development) financed by Japanese assistance. He expressed his interest to corroboration with the Project by the Infrastructure Management Working Group who has been studied on the road and bridge maintenance under the SATREPS.

(2) U Shwe Lay (Deputy Director General, Planning) mentioned that MOC had been very interested in the Bridge Database System to maintain many infrastructures constructed in seaside and/or hazardous area. He also expressed his request for expansion of the database system toward bridge maintenance management under the Project if possible. In addition, he mentioned that MOC had desired to develop the Quality and Safety Control Manual for the Construction Management and it would be achieved in 2017 under the Project.

7. Comment by JICA and Closing Remarks

Mr. Kondo from JICA Headquarters made his comments for the JCC meeting. He mentioned the importance of the Quality Control in terms of optimization of Life Cycle Cost, the effective capacity development for Safety Control based on experience of Japan and the importance of Way of Thinking to improve the Quality and Safety Control by means of continuous development and revision of technologies and its manuals.

Following the comments by JICA, U Aung Myat Oo (Deputy Director General, Management) made closing remarks with an emphasis on effort of JICA Project Team and MOC to accomplish the Project as scheduled.

Appendix-2 List of Attendance

List of Attendance (1/2)

1. Myanmar Side

No.	Name	Position	Department
1	U Win Khaing	Union Minister	Ministry of Construction (MOC)
2	U Aung Myat Oo	Deputy Director General (Maintenance), DOB	Department of Bridge (DOB), MOC
3	U Yan Naung	Director	Minister Office, MOC
JCC Member			
4	U Shwe Lay	Vice Chairperson	Deputy Director General (Planning), DOB
5	U Khin Maung Swe	Project Director	Deputy Director General (Construction), DOB
6	U Paing	Project Manager	Chief Engineer (Planning), DOB
7	U Thein Aung	Member	Chief Engineer, Maintenance Section, DOB
8	Daw Thein Nu	Member	Director, Bridge Design, DOB
9	U Kyaw Kaung Cho	Member	Director, Research and Development, DOB
10	Daw Ei Ei Myo	Member	Deputy Director, Civil, DOH
11	U Htay Win	Member	Pro: Rector Teaching, YTU
12	U Thant Zaw Wai	Member	District Engineer, YCDC
Core Trainer (CT)			
13	U Myo Thet Tun	CT, Bridge Foundation	Assistance Director, Thanlwin Bridge, DOB
14	Daw Nant Thar Mhwe	CT, Bridge Foundation	Assistance Director, Bridge Design, DOB
15	Daw Ei Htwe San	CT, Bridge Foundation	Assistance Director, Bridge Design, DOB
16	Daw Yin Yin Swe	CT, Concrete Structure	Deputy Director, BRL, DOB
17	Daw Yu Yu Naing	CT, Concrete Structure	Staff Officer, Bridge Design, DOB
18	Daw Myo Min Aye	CT, Concrete Structure	Assistance Director, BRL, DOB
19	Daw Cho Mar Oo	CT, Concrete Structure	Assistance Director, BRL, DOB
20	U Tin Maung Htwe	CT, PC Bridge	Assistance Director, Bridge Maintenance, DOB
21	U Thu Ya Thant	CT, PC Bridge	Staff Officer, Bridge Maintenance, DOB
22	U Kyaw Myo	CT, Steel Bridge	Assistance Director, DOB, Thanlwin Bridge
23	Daw Than Aye	CT, Steel Bridge	Assistance Director, Bridge Planning, DOB
24	U Shin Thant Htut	CT, Construction Safety	Assistance Director, Bridge Safety, DOB
25	Daw Ei Ei Nyein	CT, Database	Assistance Director, Bridge Planning, DOB
26	Daw Phyo Thandar Win	CT, Database	Staff Officer, Bridge Design, DOB
27	Daw Sandar Win	CT, Construction Management	Assistance Director, International Relationship, DOB
28	Daw Phyo Thandar	CT, Construction Management	Staff Officer, Bridge Design, DOB

Appendix-2 List of Attendance

List of Attendance (1/2)

2. Japanese Side

No.	Name	Organization	Position
1	Mr. Shoichi WATANABE	Embassy of Japan	Second Secretary, Economic and ODA Section
2	Mr. Akihito SANJO	JICA Myanmar Office	Senior Representative
3	Mr. Tetsushi HAYAKAWA	JICA Myanmar Office	Representative
4	Mr. Tatsuhito KONDO	JICA Headquarters	Program Officer, Team 1, Transportation and ICT Group, Infrastructure and Peacebuilding Department
5	Mr. Akira MITSUISHI	JICA Project Team	JICA Road and Bridge Policy Advisor
6	Mr. Kei SENOO	JICA Project Team	JICA Construction Management/ Monitoring and Evaluation/ Coordinator
7	Mr. Akio OKAZAKI	JICA Project Team	Team Leader/ Quality Control (Concrete Material)
8	Mr. Tatsuo MUKOYAMA	JICA Project Team	Quality Control (PC Bridge)
9	Dr. Masahiko YASUDA	JICA Project Team	Quality Control (Steel Bridge)
10	Mr. Eiji OCHIAI	JICA Project Team	Quality Control (Foundation)
11	Mr. Hajime ASAKURA	JICA Project Team	Construction Management
12	Mr. Khin Maung	JICA Myanmar Office	Advisor
13	Mr. Win Ko Ko	JICA Myanmar Office	Program Officer
14	Ms. Tin Phyo Hlaing	Senior Engineer	JICA Project Team
15	Ms. Chan Aye Hlaing	Junior Engineer	JICA Project Team
16	Ms. Poe Thiri Naing	Junior Engineer	JICA Project Team

The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

MINUTES OF MEETING
ON
2nd JOINT COORDINATION COMMITTEE (JCC) MEETING

16 June, 2017

2nd Joint Coordination Committee (hereinafter referred to as "JCC") Meeting on the Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar (hereinafter referred to as "the Project") was held on 9th June 2017 with attendance of major project counter parts representing the Ministry of Construction (MOC), representatives of JICA Myanmar Office and experts of the JICA Project Team to share the progress of activities in Stage-2 based on Monitoring Sheet submitted by JICA Project Team as shown in Appendix-1.

As a result of the discussions, the MOC confirmed progress of the Project through the Monitoring Sheet and the Project Design Matrix (PDM) of the Project.

Chair Person

U Win Tint
Permanent Secretary
Ministry of Construction, Myanmar

Vice Chair Person

U Shwe Lay
Director General
Department of Bridges
Ministry of Construction, Myanmar

U Ohn Lwin
Director General
Department of Highways
Ministry of Construction, Myanmar

Japan International Corporation Agency (JICA)

Kotaro NISHIGATA
Senior Representative
Myanmar Office, JICA

JICA Project Team

Akira MITSUISHI
Road / Bridge Policy Advisor
JICA

1. Opening Remarks

U Win Tint, Permanent Secretary of MOC remarked his cordial appreciation for the opportunity to state his greeting to JICA and the Project Team. He stated that importance of development of road and bridge in terms of balanced development in Myanmar. In addition, he remarked not only that the road and bridges should be constructed quickly and economically, but also that it should be constructed in preference to the quality for long life. In this regard, it was highlighted that the activities of the Project would be the best practice model for other organizations in Myanmar, and that the Core Trainers (CTs) of the Project would be required to aggressively participate to the training to learn the experiences of Japan and other countries.

Responding to the above remarks, Mr Kotaro NISHIGATA, Senior Representative of JICA Myanmar Office expressed his gratitude for organization of 2nd JCC meeting in honor of new appointment of Deputy Minister, U Kyaw Linn and Permanent Secretary, U Win Tint. His remarks were focused on his expectation on achievement of the Project such as development and utilization of quality and safety control manuals as well as valuable experience through training in Japan. In addition, it was remarked the importance of continuous cooperation on capacity development reviewing the achievement of past JICA Cooperation to the MOC by means of multi-scheme assistances for development of transport sector.

2. Introduction of New Core Trainers from Department of Highway (DOH)

U Saw Win, Director General of DOH introduced eight (8) new Core Trainers from DOH to enhance the project achievement by expanding the technology transfer to DOH. It was informed that the new CTs will be assigned to Concrete Structure, Safety Control, and Construction Management and that they would be participated to Workshops to develop the Quality Control Manuals, Safety Control Manual and Construction Management Guideline respectively.

3. Progress of the Project

(1) Outline of the Project & PDM

Mr. Mitsuishi, JICA Long-term Expert explained the outline of the Project and Project Design Matrix (PDM) to remind scheme and timeframe of the Project. In addition, it was explained overall goal of the project, project purpose and outputs of the Project based on PDM. It was explained also that current situation in Stage-II and future roles of CTs such as implementation of pilot project and/or dissemination of their knowledge to other engineers, to be performed in the next stages of the Project.

(2) Project Monitoring Sheet

Contents of the Project Monitoring Sheet were explained by Mr. Seno, Long-term expert of JICA

Project Team. It was informed that that Project has been implemented smoothly without any delay in the activity. In addition, he introduced JICA short term experts who attended the JCC Meeting.

4. Report of 1st Japan Training

Daw Yin Yin Swe, Director of DOB presented their achievement of 1st Training in Japan conducted from 8 to 19 May 2017 as below.

(1) Training was conducted in corporation with the Ministry of Land, Infrastructure, Transport and Tourism, NEXCO-East, IHI Construction Service, University of Kyoto, Metropolitan Expressway, JFE steel and University of Saitama were presented.

(2) The technologies such as basic principle of quality control, qualified and economical production of PC structure, and bridge construction technologies, specifications for civil engineering was introduced through the training, which would be applicable to the development of infrastructure in Myanmar. The slope protection technologies and wind-tunnel test for cable stayed bridge and safety management on site were new experiences for participants of the training.

(3) Following actions plans to be taken by the participants of the training based on lessons learned from the training in Japan were presented.

- to improve project management system, construction plan and inspection of bridge construction projects in Myanmar;
- to improve Quality Control system and technologies for bridge construction projects in Myanmar;
- to improve Safety Control system of Myanmar Projects; and
- to develop standard and specification, construction manual for bridge construction projects of Myanmar by referring or adapting Japanese Standard Specifications and knowledge from this training program.

5. Progress in Activities of the Project

(1) Construction Management

Daw Ei Ei Myo from DOH presented about major items of the Construction Management, component of the Construction Management System, approach to develop the Construction Management Guideline and future schedule of the Workshops to develop the Guideline.

(2) Concrete Structure

U Soe Thiha from DOH presented the schedule of the Workshop for concrete structure, how to approach to manual development, achievement of training and result of nationwide chloride contents measurement.

(3) PC Structure

Daw Theint Han Su Kyan from DOB presented key point and major contents of the quality control manual such as grouting control with air outlet and MS sensor, the

tensioning control with inspection sheets and items and schedule of the PC structure.

(4) Steel Structure

U Thet Wai Aung from DOB presented basic approach of AASHTO and Japanese Highway and Bridge Standards (JHBS), achievement of steel structure Workshops, contents of steel structure manual and issues to be considered for MOC.

(5) Foundation

U Myo Thet Tun from DOB presented the component of manual discussed among JICA Expert and CTs, achievement of Workshops, progress of work and its achievement as well as future schedule. In addition, it was highlighted that the candidate bridge for pilot project to apply PC pile would be required to be presented by MOC.

(6) Construction Safety

U Shin Thant Htut from DOB presented about contents of safety control manual such as general and safety management, schedule of preparation of safety control Manual, PDCA for safety management and reporting procedure draft of disaster and occupational accidents.

(7) Bridge Database

Daw Ei Ei Nyein from DOB presented the concept of the database system, type of data to be stored, progressed and schedule on development of database system. In addition, as actions to be taken by MOC as well as DOB, it was informed to pay monthly maintenance cost of the data base system to MPT Data Center from July 2017 and to establish institutional framework for sustainable operating of the database.

6. Future Schedule of Stage-II

Mr. Okazaki, Team Leader of JICA Project Team informed the future schedule in Stage 2 of the Project. It was remarked that draft of the manuals would be prepared by the end of October 2017 for trial use for On-the-Job Training through Pilot Project scheduled in Stage-3. In this connection, Mr. Okazaki also reminded that candidates of construction sites especially for PC Girder, Steel Girder and PC pile foundation should be proposed by MOC. MOC agreed that they would select the appropriate candidate sites and inform to JICA Project Team by the end of June 2017.

7. Others

(1) Question from YTU regarding the Disaster Control

Daw Khin Than Yu, the Pro-Rector Teaching from YTU asked about any opportunity of cooperation through this project for disaster control in design, construction management planning, safety and maintenance which have been one of critical issue in Myanmar. Responding to the question, Mr. Okazaki explained that the Project activity would be focused on the quality and safety control for the Construction Work, and design issues and maintenance issues for disaster control may be discussed by the other project.

Based on the discussion, U Shwe Lay, Director General of DOB asked JICA about the possibility of technical cooperation for Disaster Control, and Mr. Nishigata advised him to officially request to JICA.

(2) Proposal of Training in Factories

Daw Thein Nu presented her idea about the training in J&M and I&H factories for design and fabrication of steel bridge by sending CTs to the factory. Responding above idea, Mr. Mitsuishi answered that he would convey the idea to J&M and I&H.

(3) Request for Additional input from JICA for Steel Bridge

During the meeting, U Shwe Lay asked Dr. Yasuda, Expert of Quality Control for Steel Bridge, to point out current capacity in quality control of steel bridge. Dr. Yasuda expressed his concern about the quality control of steel bridge particularly in understanding of design parameter related to the construction. It was pointed out that the detailed design of steel bridge submitted by manufacturer has not been well examined prior to the construction and it should be improved as a part of quality control. In this connection, U Shwe Lay asked JICA for additional training for the design review for steel bridge.

Responding to the above comment, Mr. Kondo from JICA head Office mentioned that he would convey this issue to JICA Head Office to discuss supplemental input for the training in design review under the Project.

8. Comments by JICA Representative

Mr.Kondo, from JICA Head Office expressed his appreciation to MOC as the Project has been implemented smoothly and on schedule. Meanwhile, he pointed out the importance of dissemination of the knowledge and experience through the training in Japan to the wider engineer in MOC and in Myanmar. In this regard, it was emphasized that all CTs including newly participated from DOH were expected to play a role to disseminate their experience and knowledge learned from the Project to other MOC staff. In addition, he remarked as conclusion that JICA have expected CTs and MOC to challenge and to overcome many difficulties to achieve targets of the Project in remaining two (2) years.

9. Closing Remarks

U Shwe Lay declared successful closing of the 2nd JCC meeting with his appreciation to the JICA and other participants. He also expressed his gratitude on activities of the Project to develop Quality and Safety Control Manual as well as the Construction Management Guideline. In addition, he remarked that MOC had desired to develop the typical design manual for road and bridge structure in the near future.

He also highlighted with appreciation for JICA Experts that the CTs were able to well explain their presentation concerning respective subjects at today's meeting, which was deemed as great progress and achievement compare to 1st JCC meeting.

Appendix-2: Attendance List

1. Myanmar Side

No.	Name	Position under the Project	Department
JCC Member			
1	U Win Tint	Chair Person	Permanent Secretary, MOC
2	U Saw Win Naing (Behalf of U Ohn Lwin)	Member	Deputy Director General (Planning) DOH
3	U Shwe Lay	Vice Chairperson	Director General, DOB
4	Dr. Khin Than Yu	Member	Pro: Rector Teaching, YTU
5	U Kyin Ohnn	Member	Assistant Head of Department , YCDC
6	U Khin Maung Swe	Project Director	Deputy Director General (Construction), DOB
7	U Aung Myat Oo	Member	Deputy Director General (Maintenance), DOB
8	U Kyaw Kaung Cho	Member	Chief Engineer, DOB
9	Daw Thein Nu	Member	Chief Engineer, DOB
10	Daw Htar Zin Thin Zaw	Member	Director, Research and Development, DOH
11	U Nay Win Aung	Member	Assistant Director, Minister Office
12	Daw Ei Ei Myo	Member	Deputy Director, Civil, DOH
Core Trainer (CT)			
13	Daw Yin Yin Swe	CT, Concrete Structure	Director, DOB
14	U Myo Thet Tun	CT, Bridge Foundation	Assistant Director, DOB
15	Daw Ei Ei Nyein	CT, Database	Assistant Director, DOB
16	U Shin Thant Htut	CT, Construction Safety	Assistant Director, DOB
17	U Thet Wai Aung	CT, Steel Bridge	Assistant Director, DOB
18	Daw Theint Han Su Kyaw	CT, PC Bridge	Staff Officer, DOB
19	U Soe Thiha	CT, Concrete Structure	Junior Engineer 2, DOH
20	Daw Sandar Win	CT, Construction Management	Assistant Director, DOB
21	Daw Phyo Thandar	CT, Construction Management	Staff Officer, DOB
22	U Kyaw Myo	CT, Steel Bridge	Assistant Director, DOB
23	Daw Than Aye	CT, Steel Bridge	Assistant Director, DOB
24	Daw Htet Htet Aung	Announcer	Junior Engineer, DOB
25	U Tun Aung Kyaw	CT, Construction Safety	Staff Officer, DOH
26	U Ye Tun	CT, Construction Management	Staff Officer (Civil), QA/QC Section (Construction), DOH

27	U Ko Ko Naing	CT, Construction Management	Staff Officer (Civil), QA/QC Section (Construction), DOH
28	Daw Thin Nu Shwe	CT Safety Control	Staff Officer (Civil), QA/QC Section (Construction), DOH
29	Daw Thae Phyu Phyu Moe	CT, Concrete Structure	Staff Officer (Civil), RRL, DOH
30	Daw Hnin Yu Aung	CT, Concrete Structure	Junior Engineer (1) (Civil), Pavement Design, DOH
31	Daw Su Myat Sandi Thaw	CT, Concrete Structure	Junior Engineer (2) (Civil), RRL, DOH
32	U Zaw Thu Lin	CT Safety Control	Assistant Director, DOB
33	Daw Thwe Thwe Tun	CT Safety Control	Staff Officer, DOB
34	Daw Phyo Thandar Win	CT, Database	Staff Officer, DOB
35	Daw Nant Thar Hmwe	CT, Bridge Foundation	Assistant Director, DOB
36	Daw Ei Htwe San	CT, Bridge Foundation	Assistant Director, DOB
37	Daw Yu Yu Naing	CT, Bridge Foundation	Staff officer, DOB
38	Daw Myo Min Aye	CT, Concrete Structure	Assistant Director, DOB
39	Daw Cho Mar Oo	CT, Concrete Structure	Assistant Director, DOB
40	Daw Khin Moe Moe	CT, Concrete Structure	Staff officer, DOB
41	U Kyaw Kyaw		DOH

2. Japan Side

No.	Name	Organization	Position
1	Mr. NISHIGATA Kotaro	JICA Myanmar Office	Senior Representative
2	Mr. KONDO Tatsuhito	JICA Head Office	Program Officer, Team1, Transportation and ICT Group, Infrastructure and Peacebuilding Department
3	Ms. SHOJI Mayumi	JICA Myanmar Office	Representative
4	Mr. Tanaka Yosuke	Embassy of Japan	Second Secretary, Economic & ODA Section
5	Mr. Khin Maung	JICA Myanmar Office	Advisor
6	Mr. Win Ko Ko	JICA Myanmar Office	Program Officer
7	Mr. MITSUISHI Akira	JICA Project Team	JICA Road and Bridge Policy Advisor
8	Mr. SENOO Kei	JICA Project Team	JICA Construction Management / Monitoring and Evaluation / Coordinator
9	Mr. OKAZAKI Akio.	JICA Project Team	Team Leader / Quality Control (Concrete Material)
10	Mr. MUKOYAMA Tatsuo	JICA Project Team	Quality Control (PC Bridge)

11	Dr. YASUDA Masahiko	JICA Project Team	Quality Control (Steel Bridge)
12	Mr. OCHIAI Eiji	JICA Project Team	Quality Control (Foundation)
13	Ms. Tin Phyo Hlaing	JICA Project Team	Staff
14	Ms. Chan Aye Hlaing	JICA Project Team	Staff
15	Ms. Poe Thiri Naing	JICA Project Team	Staff

The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

MINUTES OF MEETING
ON
3rd JOINT COORDINATION COMMITTEE (JCC) MEETING

10th November, 2017

The 3rd Joint Coordination Committee (hereinafter referred to as "JCC") Meeting on the Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar (hereinafter referred to as "the Project") was held on 10th November 2017 with attendance of major project counter parts representing the Ministry of Construction (MOC), representatives of JICA Myanmar Office and experts of the JICA Project Team to share the progress of activities in Stage-2 through the detailed discussion as shown in Appendix-1.

As a result of the discussions, the MOC confirmed progress of the Project through the Monitoring Sheet and the Project Design Matrix (PDM) of the Project submitted by JICA Project Team (Appendix-2) as well as the contents of Quality and Safety Control Manual for Road and Bridge Construction (hereinafter referred to as "the Manual").

Chair Person

U Win Tint
Permanent Secretary
Ministry of Construction, Myanmar

Vice Chair Person

U Shwe Lay
Director General
Department of Bridges
Ministry of Construction, Myanmar

U Ohn Lwin
Director General
Department of Highways
Ministry of Construction, Myanmar

Japan International Corporation Agency (JICA)

Kotaro NISHIGATA
Senior Representative
Myanmar Office, JICA

JICA Project Team

Akira MITSUISHI
Road / Bridge Policy Advisor
JICA

Appendix-1: Details of the Meeting

1. Opening Remarks

U Win Tint, Permanent Secretary of MOC, remarked his cordial appreciation for the Project aiming at development of MOC's capacity in road and bridge construction, which needs to meet requirement of ASEAN standard.

He highlighted that the outcome of the Project would contribute to upgrading the engineering capacity of Myanmar to meet the requirement of international standard in terms of design, construction and maintenance.

It was also remarked that the Core Trainers (CTs) would be trained in accordance with the schedule proposed by the Project, and that quality of construction as well as construction management system for road and bridge in Myanmar would be improved after the Project

2. Greeting by JICA Representative

Mr. Nishigata, Senior Representative of JICA Myanmar Office expressed his gratitude for strong support by MOC to organize the 3rd JCC meeting and for smooth implementation of the Project.

In addition, it was supplemented that further corporation by MOC would be essential for the Pilot Project to be implemented in Stage III after November 2017 for on-the-job-training of CTs and for trial application of the Manual.

In this connection, he expressed his strong interest in the progress and achievement of Manual as well as bridge inventory database to be explained by Project Team in this JCC, which were deemed as remarkable milestone not only for the Project but also for development of road and bridge in Myanmar for the future.

3. Progress of the Project

It was explained by Mr. Senoo that the activities of the Project have been performed in accordance with original schedule without significant delay. Following specific activities performed under the Project were introduced.

- General introduction of the activities such as the baseline survey carried out in Stage I of the Project up to November 2016.
- 1st Training in Japan conducted in May 2017
- Activities in Stage-2 performed by the Long-term Expert such as training and lectures for maintenance technology of road and bridge in Japan.
- Activities in Stage-2 performed by JICA Short-term Experts and CTs such as workshops to develop the Quality and Safety Control Manuals as well as the Bride Inventory Database.
- Study tour to J&M and I&H factories and lecture of steel design examination for steel bridge were provided due to request of MOC from 2nd JCC meeting.

- Preparation of Pilot Project by JICA Expert Team to be implemented in Stage-III of the Project.

4. Progress on Manuals/ Database

Draft of the Quality and Safety Control Manual for Road and Bridge Construction (the Manual) was introduced by Mr. Okazaki, Team Leader of JICA Expert Team as below.

- The Manual consists of three (3) Categories, namely I-Quality Control Manual, II Safety Control Manual and III Construction Management Guideline.
- The Manual was developed by CTs and JICA Expert Tram through Workshop during Stage-2 of the Project.
- The Manual should be reviewed and finalized through trial application to the Pilot Project by October 2018.
- MOC would be required to disseminate the Manual after authorization in the final stage of the Project.

5. Progress on Bridge Inventory Database

Progress of bridge inventory database system with demonstration of its operation were presented by Daw Ei Ei Nyein, CT of the Bridge Inventory Database as shown below.

- The Database Server had already installed at MPT Datacenter in August 2017.
- Eight hundred forty-eight (848) of bridges will be the target bridge to be input to database system.
- 43% of basic data for target bridges had already collected as of November 2017.
- Documents data such as completion reports and detail drawing, etc. should be collected and input by the beginning of 2018.
- The Database System should be maintained and operated by Bridge Research and Development Section in the future.
- Document data of old bridges constructed before 1988 would not be available.
- Coordinate data of the bridges would not be input and not be shared with MOC due to complicated security condition in Myanmar.

6. Comments by Core Trainers

On behalf of CTs in DOB, Daw Yin Yin Swe, Director of Quality Control and Safety Section provided following comments on the Project.

- CTs improved not only engineering skills in relevant field but also English communication skill through overall activity of the Project.
- The Manual is the output of the Project which would change the situation that there were no standard and manual for road and bridge construction in Myanmar.
- The Manual shall be followed by DOB for their bridge construction.
- CTs would share their knowledges to all concerned staff of MOC through periodic training in Central Training Center.
- Discussion with all of Project Directors of Construction Units should be made before

dissemination of these manuals to obtain and reflect comments and suggestions by Project Directors based on their experiences.

On behalf of CTs in DOH, Daw Ei Ei Myo, Deputy Director of QA/ QC Section - Maintenance expressed her gratitude all participants in this 3rd JCC meeting with following comments.

- Safety control manual is to be utilized not only for bridge but also road construction. It is required to incorporate the Safety matter for road construction such as how to improve safety for black spots along with existing road, how to install safety facility and sign board, and how to follow safeguard procedures into the Manual.
- Regarding the workshop and the manual for Quality Control of Concrete Structure, it would be important for CTs to learn more specific construction work for road and bridge sector respectively.
- Discussions and Workshop together with JICA Expert has been providing not only fruitful knowledges for CTs but also develop overall capacities of MOC's engineers.
- Pilot Project for road construction would be strongly required as same as pilot project for bridge construction.

7. Schedule of STAGE-3 (Implementation of Pilot Project)

Mr. Okazaki, Team Leader of JICA Expert Team explained the schedules of Stage-3 and 4 as below.

- Target bridges of Pilot Project were confirmed by JCC members. Myaung Mya Bridge for Concrete Works and Foundation, Taung Bway Bridge for PC Girder and NGA WON (& Dar Let Chaung) Bridge for Steel Bridge were selected as target of the Pilot Project.
- The CTs and JICA Expert will visit the site of the Pilot Project from January to April 2018.
- Prior coordination and sharing the Manual and Check Sheet with the Project Directors of each target bridge are important to smoothly implement the Pilot Project.
- Record of quality and safety control information from construction site shall be collected and review meeting shall be held with Project Directors, CTs and JICA experts.
- Recommendation for the Manual shall be proposed based on the experience of the Pilot Project.
- The Manuals shall be disseminated to MOC engineers related to construction work by CTs.

Mr. Mitsuishi, Long term Expert of JICA proposed technical transfer for PPP (Public Private Partnership) which was one of the most typical way to stimulate the development of infrastructures. It was proposed that PPP seminar and workshop would be held in

February 2018. Lectures on PPP will be provided by Dr. Minato, University of Tokyo. Some foreign experts would be invited to discuss how to enhance development of infrastructure in Myanmar. MOC and Ministry of Planning and Finance would be invited to the seminar and workshop.

8. Comments and Closing Remarks

U Paing, Chief Engineer of DOB-Planning expressed his gratitude for the Project and gave instruction to CTs to effectively utilize this opportunity to lean the Japanese Technology provided by JICA Experts. He remarked the Project would contribute to improvement of the MOC's capacity in terms of following effect brought by the Project.

i) MOC is taking opportunity to share and practice the Japanese engineering technology brought by JICA Expert.

ii) The outputs of the Project are valuable and beneficial not only for CTs but also for JCC members of DOH and DOB.

iii) Core personnel who would play key role in MOC in near future would be trained as CTs by the Project.

In the last, he remarked that MOC would prioritize to develop the capacity of bridge maintenance based on the fact that many of bridges are facing urgent needs of maintenance in Myanmar. In this context, he requested JICA to consider the next phase of the Project for capacity development in bridge maintenance

Appendix-3: Attendance List

1. Myanmar Side

No.	Name	Position under the Project	Department
JCC Member			
1	U Win Tint	Chair Person	Permanent Secretary, MOC
2	U Thaung Myint Tun (On Behalf of U Aung Myint Oo)	-	Chief Engineer, DOH
3	Dr. Khin Than Yu	Member	Pro: Rector Teaching, YTU
4	U Kyin Ohnn	Member	Assistant Chief Engineer, YCDC
5	U Khin Maung Swe	Project Director	Deputy Director General (Construction), DOB
6	U Aung Myat Oo	Member	Deputy Director General (Maintenance), DOB
7	U Paing	Project Manager	Chief Engineer, DOB
8	U Thein Aung	Member	Chief Engineer, DOB
9	Daw Thein Nu	Member	Chief Engineer, DOB
10	Daw Ei Ei Myo	Member	Deputy Director, Civil, DOH
Core Trainer (CT)			
1	Daw Yin Yin Swe	Director	CT, Concrete Structure (DOB)
2	U Kyaw Myo	Deputy-Director	CT, Steel Bridge (DOB)
3	Daw Sandar Win	Deputy-Director	CT, Construction Management (DOB)
4	Daw Ei Ei Nyein	Deputy-Director	CT, Database (DOB)
5	Daw Ei Htwe San	Deputy-Director	CT, Bridge Foundation (DOB)
6	U Myo Thet Tun	Assistant Director	CT, Bridge Foundation (DOB)
7	U Tin Maung Htwe	Assistant Director	CT, PC Bridge (DOB)
8	U Shin Thant Htut	Assistant Director	CT, Construction Safety (DOB)
9	U Soe Lwin	Assistant Director	CT, Construction Safety (DOH)
10	Daw Nant Tha Hmwe	Assistant Director	CT, Bridge Foundation (DOB)
11	Daw Myo Min Aye	Assistant Director	CT, Concrete Structure (DOB)
12	Daw Cho Mar Oo	Assistant Director	CT, Concrete Structure (DOB)
13	Daw Than Aye	Assistant Director	CT, Steel Bridge (DOB)
14	Daw Phyoe Thandar Win	Assistant Director	CT, Database (DOB)
15	U Soe Thiha	Staff Officer	CT, Concrete Structure (DOH)
16	U Ye Htun	Staff Officer	CT, Construction Management (DOH)

17	U Ko Ko Naing	Staff Officer	CT, Construction Management (DOH)
18	Daw Yu Yu Naing	Staff Officer	CT, Bridge Foundation (DOB)
19	Daw Thae Phyu Phyu Moe	Staff Officer	CT, Concrete Structure (DOH)
20	Daw Thwe Thwe Tun	Staff Officer	CT, Construction Safety (DOB)
21	Daw Tin Thuzar Win	Staff Officer	CT, Database (DOB)
22	Daw Aye Aye Khaing	Staff Officer	CT, Construction Safety (DOH)
23	Daw Theingi Min Thu	Junior Engineer (1)	CT, Construction Safety (DOH)
Guest			
1	Daw Htet Htet Aung	Staff Officer	Development of Human Resource & Information
2	Daw Hsu Yi Win	Staff Officer	Bridge Research & Development

2. Japan Side

No.	Name	Organization	Position
1	Mr. Tanaka Yusuke	Embassy of Japan	Second Secretary, Economic & ODA Section
2	Mr. NISHIGATA Kotaro	JICA Myanmar Office	Senior Representative
3	Ms. SHOJI Mayumi	JICA Myanmar Office	Project Formulation Advisor
4	Ms. May Thonedra Myo	JICA Myanmar Office	Secretary
5	Mr. MITSUISHI Akira	JICA Project Team	JICA Road and Bridge Policy Advisor
6	Mr. SENOO Kei	JICA Project Team	JICA Construction Management / Monitoring and Evaluation / Coordinator
7	Mr. OKAZAKI Akio.	JICA Project Team	Team Leader / Quality Control (Concrete Material)
8	Mr. TAKAGI Nobuhiko	JICA Project Team	Steel Bridge Design Examination
9	Ms. Tin Phyo Hlaing	JICA Project Team	Staff
10	Mrs. Chan Aye Hlaing	JICA Project Team	Staff
11	Ms. Poe Thiri Naing	JICA Project Team	Staff

The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

MINUTES OF MEETING ON 4th JOINT COORDINATION COMMITTEE (JCC) MEETING

20th June, 2018

The 4th Joint Coordination Committee (hereinafter referred to as "JCC") Meeting on the Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar (hereinafter referred to as "the Project") was held on 20th June 2018 with attendance of major project counter parts representing the Ministry of Construction (MOC), representatives of JICA Myanmar Office and experts of the JICA Project Team to share the progress of activities in Stage-3 through the detailed discussion as shown in Appendix-1.

As a result of the discussions, the MOC confirmed progress of the Project through the Monitoring Sheet and the Project Design Matrix (PDM) of the Project submitted by JICA Project Team (Appendix-2) as well as the achievement of Pilot Project based on the Quality and Safety Control Manual for Road and Bridge Construction (hereinafter referred to as "the Manual").

Chair Person

U Win Tint
Permanent Secretary
Ministry of Construction, Myanmar

Vice Chair Person

U Shwe Lay
Director General
Department of Bridge
Ministry of Construction, Myanmar

U Ohn Lwin
Director General
Department of Highways
Ministry of Construction, Myanmar

Japan International Corporation Agency (JICA)

Kotaro NISHIGATA
Senior Representative
Myanmar Office, JICA

JICA Project Team

Akira MITSUISHI
Road / Bridge Policy Advisor
JICA

Appendix-1: Details of the Meeting

1. **Opening Remarks**

U Han Zaw, Union Minister, explained urgent issue to meet the ASEAN standard in terms of construction technology as well as development of infrastructure. It was also explained that MOC has insufficient capacity to utilize advanced technology learned through the project provided by international organization such as JICA, ADB, WB, and so on.

He remarked his expectation that construction management system in MOC would be more effective and systematic through several activities under the current capacity development project provided by JICA.

He addressed his request that further assistance would be required from JICA to improve bridge maintenance capacity to maintain the bridges constructed 20 years ago, and to enhance their capacity on hydrological survey for design of crossing the river.

2. **Greeting by JICA Representative**

Mr. Nishigata, Senior Representative of JICA Myanmar Office expressed his gratitude for strong support and kind cooperation of MOC's esteemed organization to implement the Project as scheduled. He remarked that continuous cooperation and support of MOC to facilitate the activity of the Project would be very important to share the know-how of the technology learned through the Project within MOC. It was also anticipated that the dissemination of the technology in construction supervision to the public in upcoming year 2019. At the end, he explained that JICA had been committed to support MOC not only for development of road and bridge infrastructure, but also for human resources which drive as main gear of Myanmar's socio-economic development.

3. **Progress of the Project**

It was explained by U Paing, Chief Engineer of MOC that the activities of the Project have been performed in accordance with original schedule without any significant delay. Following specific activities performed under the Project were introduced.

- Workshops in Stage-II
- On-the-Job-Training Activities in five fields (Bridge Foundation, Concrete Structure, PC Structure, Steel Structure and Safety Management)
- System Development Activities for Inventory Database & further technical assistance by JICA experts

4. **Comments of JICA Long-term Experts**

Mr. Mitsuishi and Mr. Senoo, long-term experts from JICA mentioned their comments on the progress of the Project. The authorization of the manuals was highlighted as important undertakings of the MOC. It is also essential to clarify how to follow the manual after dissemination. In addition, the necessity for enhancement of quality control system at construction site was pointed out by them based on observation during the OJT through pilot projects.

5. Introduction of 2nd Training in Japan

Daw Ei Ei Myo, Director of DOH reported their achievement of 2nd Training in Japan conducted from May 7 to 18, 2018. It was presented the major contents of the training and their output of the training to introduce their knowledge to Myanmar. Followings were informed as their achievement through the training.

- Japanese procurement system including tendering, negotiation, quality assurance, evaluation and contracting
- Safety control and measures in Japanese construction industry
- Technologies in Traffic Control Center, and take action on safety measures and accident prevention
- Construction and installation of reinforced concrete retaining wall and slope protection method by means of quality management
- Concrete technology and quality control in construction industry

To introduce above knowledge learned from the training in Japan, following action plans were proposed.

- Implementation of regular safety inspection, periodic safety meeting, adequate safety signs and budgetary allocation for safety measures should be carried out for improvement of safety control.
- Specification of the construction and procedures of quality control should be understood and shared with the Engineer and the Contractor to improve the quality control.
- Trial execution prior to actual construction, and feedback of experience based on actual construction should be practiced to enhance the capacity of construction management.

6. Achievement of Pilot Project

Core Trainers (C/Ts) presented their achievement of the OJT through Pilot Projects conducted from December 2017 to April 2018. The C/Ts for Concrete Structure, PC Bridge, Steel Bridge, Bridge Foundation, and Safety Control respectively introduced their findings and achievements as shown below.

- Concrete Structure: Construction planning, new items of inspection and work procedure of concrete pouring were confirmed at the Pilot Project Site.
- PC Bridge: New Test methodology for Grouting Material, Grouting Volume checking and calculation with Manual, usage of Inspection Sheets and Graphs.
- Steel Bridge: Introduction of inspection at the Fabrication stage and Erection stage.
- Bridge Foundation: Quality Control procedures for Bored Pile and PHC Pile with check list.
- Safety Control: General Safety Measure and safety in Bridge Erection at Ngawon bridge and Taungbwe bridge.

7. Future Schedule and Issues

Mr. Okazaki, Team Leader of the Project introduced future activities on the Project and current issues to enhance the Capacity of MOC.

<Future Schedule>

- Final Draft of Manuals would be submitted by the end of August 2018 to be authorized by MOC. The Manual will be widely disseminated in Myanmar during Stage IV started from December 2018.
- The Manuals would be translated to Myanmar Language by the assistance of Project Team.
- OJT for the C/Ts would be conducted to enhance their understanding up to the end of Stage IV.

<Issues>

- Organization to operate the Bridge Database System should be enhanced to complete the data input as well as update the data for new bridges. O&M section needs to be involved to undertake the database operation.
- Quality Control System at construction site should be enhanced to strictly control the quality. Quick judgement of QC Engineer to reject or approve the inspection result, and immediate action at construction site shall be practiced especially at small scale construction site.

8. Comments and Discussion

Following comments, question and answer were discussed based on the presentations of C/T and JICA Project Team.

i) Daw Yin Yin Swe explained current situation of construction site. The QC engineers have immediately informed to site engineers for failure inspection or test result, however, there are some difficulties to change immediately the substandard constituent materials because of the time limit in construction work. She explained that QC team should enhance their inspection capacity and enforcement system to improve the quality control at the construction site.

ii) U Shwe Lay pointed out that substandard materials could be used in accordance with the observations from OJT, and it would be necessary to check the activity performed by QC engineers for further discussion.

iii) Mr. Okazaki supplementary explained that the point is not the lack of knowledge in QC and site engineers, but the lack of system to control the quality. It was also explained that proper inspection and its recording system could improve the situation and assure the quality. He mentioned that the conclusion of this discussion should be incorporated to the construction management manual.

iv) U Khin Maung Swe, DDG Construction of DOB appreciated Mr. Okazaki's comment and

recognized that weak quality control system had been applied in small scale construction site by assigning lower level staff for supervising. He opined that DOB would assign the suitable engineers for inspection of small-scale construction site in the future.

v) U Kyaw Kaung Cho, Chief Engineer of DOB gave his comment that the quality control such as Sonic Integrity Test (SIT) had been undertaken at both small construction site and medium /long span bridges site, and that site engineer could not continue the work without any acceptance of the SIT inspection. It is also explained as an example of current situation that site engineers should consult with designer in case any failure, and final decision should be made by designer to reject or approve.

vi) U Kyi Zaw Myint gave his opinions that the presentation by CTs and current discussion were focused on how to perform at the construction as per construction manual. Thus he requested to provide idea how to apply these manuals for construction management since he believed the most important issue should be roles and responsibilities of all level staff related to the construction.

vii) U Paing concluded the discussion as below.

- Authorization for manual can be carried out in time with the schedule proposed by the Project.
- MOC would fulfill the requirement of institutional framework with sufficient member to update the data in Bridge Inventory Database System.
- They will improve the practice for the improper QC process at the site.

viii) U Paing requested to JICA to provide the Project for Maintenance Technology as Phase-2 of current project. Moreover, he requested to include technology transfer of Hydrology Engineering in Phase-2 according to Union Minister's remarks.

9. Future Assistance by JICA

Mr. Tsuda, JICA Tokyo Head Office, explained the importance of the Operation and Maintenance, and introduced example of the road and bridge asset management program implemented by JICA as below.

i) After the event of Myaungmya Bridge collapse, investigation and inspection for bridges had been conducted and found that several bridges are also fragile. From this result, urgency level for bridge sector can be analyzed as the priority sector to provide special measures. Through the observation, Operation and Maintenance of Bridge can be preferentially focused in terms of Sustainability and cost-efficiency in long-term as well as complement of the flaw by ownership of Myanmar.

ii) Asset Management is a systematic process of deploying, operating, maintaining, upgrading, and disposing of assets. Element of Asset Management is divided into three components such as 1) Budget, 2) Technology and 3) Human Resources. JICA has multilateral schemes to cooperate the Asset Management such as Utilization of "Training Scheme", Utilization

of "Technical Cooperation Scheme" and Utilization of "ODA loan/ Grant aid". As for human resource development, JICA have Scholarship program to dispatch human resource from Myanmar to Japanese University for both short-term and long-term training.

10. Closing Remarks and Comments from MOC

U Kyaw Kaung Cho gave his remarks with following view points:

- There are lots of benefits from the Project even though MOC still needs to fill the gap between the actual condition and manual, and
- MOC would like to request to JICA for road and bridge operation & maintenance project and detail hydrological engineering.

U Shwe Lay delivered closing remarks as follows:

- Universities are expected to achieve high quality education and high research capacity with the international level by 2020. JICA has provided current capacity development project to MOC focused on practical construction field, and simultaneously has provided the project to develop the human-resources at YTU & MTU. Based on these experiences, it was aware that academic field by YTU/MTU and professional filed by MOC should be well coordinated for effective capacity development.
- MOC has already requested to JICA to provide the Project for Capacity Development of Operation and Maintenance" as Phase-II. According to Union Minister, it would be preferable to collaborate with the universities in terms of research and testing, and to consider establishment of hydrological section in DOB.
- As a message from U Kyaw Lin, Deputy Minister of MOC, the assignment of JICA long-term experts would be requested to extend at least next 2 years.

-END-

Appendix-3: Attendance List

1. Myanmar Side

No.	Name	Position under the Project	Department
JCC Member			
1	U Han Zaw	Chairperson	Minister of MOC
2	U Win Tint	Vice Chairperson	Permanent Secretary, MOC
3	U Ohn Lwin	Member	Director General, DOH
4	U Shwe Lay	Member	Director General, DOB
5	U Aung Myint Oo		Deputy Director General (Planning), DOH
6	U Khin Maung Kyaw		Deputy Director General (Maintenance), DOH
7	U Khin Maung Swe	Project Director	Deputy Director General (Construction), DOB
8	U Kyi Zaw Myint		Deputy Director General (Planning & Economic, Department of Building)
9	U Paing	Project Manager	Chief Engineer (Planning), DOB
10	Daw Thein Nu	Member	Chief Engineer, DOB
11	U Kyaw Kaung Cho	Member	Chief Engineer, DOB
12	U Thet Zaw Win (Daw Hla Hla Thawe)	Member	Director, DOH (Director, Research and Development, DOH)
13	Daw Ei Ei Myo	Member	Director (Civil), DOH
14	U Aye Ko (U Kyin Ohnn)	Member	Assistant Chief Engineer, YCDC (Deputy Head of Department, YCDC)
Core Trainer (CT)			
15	Daw Nant Tha Hmwe	CT, Bridge Foundation	Deputy Director, Bridge Design, DOB
16	Daw Ei Htwe San	CT, Bridge Foundation	Deputy Director, Bridge Design, DOB
17	Daw Yu Yu Naing	CT, Bridge Foundation	Staff Officer, Bridge Design, DOB
18	Daw Yin Yin Swe	CT, Concrete Structure	Director, Quality Control & Safety, DOB
19	Daw Cho Mar Oo	CT, Concrete Structure	Assistant Director, BRL, DOB
20	Daw Khin Moe Moe	CT, Concrete Structure	Staff Officer, BRL, DOB
21	U Soe Thiha	CT, Concrete Structure	Staff Officer, RRL, DOH
22	Daw Thae Phyu Phyu Moe	CT, Concrete Structure	Staff Officer, RRL, DOH

23	U Thura Thant	CT, PC Bridge	Staff Officer, Bridge Special Unit-4, DOB
24	Daw Theint Han Su Kyaw	CT, PC Bridge	Assistant Director, Environmental & Social Section (Minister Office's Attach), DOB
25	U Kyaw Myo	CT, Steel Bridge	Deputy Director, Bridge Special Unit-9, DOB
26	U Thet Wai Aung	CT, Steel Bridge	Assistant Director, Bridge Design, DOB
27	Daw Than Aye	CT, Steel Bridge	Assistant Director, Bridge Planning, DOB
28	U Shin Thant Htut	CT, Safety Control	Assistant Director, Bridge Special Unit-6, DOB
29	U Zaw Thu Lin	CT, Safety Control	Assistant Director, Kyaukme District, DOH
30	Daw Thwe Thwe Tun	CT, Safety Control	Staff Officer, Bridge Planning, DOB
31	Daw Ei Ei Nyein	CT, Database	Deputy Director, Bridge Planning, DOB
32	Daw Tin Thu Zar Win Daw Hsu Yee Win	CT, Database	Staff Officer, Bridge Special Unit 12, DOB Staff Officer, DOB
33	Daw May Zin Maung (Daw Phyoe Thandar Win)	CT, Database	Staff Officer, Bridge Planning, DOB Assistant Director, Bridge Planning, DOB
34	Daw Sandar Win	CT, Construction Management	Deputy Director, International Relationship, DOB
35	Daw Ei Ei Myo	CT, Construction Management	Director (Civil), QA/QC Section (Maintenance), DOH
36	U Soe Lwin	CT, Safety Control	Assistant Director, Road & Airfield Design Section, DOH
37	Daw Moe Moe Khaing	CT, Construction Management	Assistant Director, QA/QC Section (Maintenance), DOH
38	U Ko Ko Naing	CT, Construction Management	Staff Officer (Civil), QA/QC Section (Construction), DOH
39	Daw Hnin Yu Aung	CT, Concrete Structure	Staff Officer, Pavement Structure Design, DOH
40	Daw Aye Aye Khaing	CT, Safety Control	Staff Officer, QA/ QC Section (Construction), DOH
41	Daw Su Myat Sandi Thaw	CT, Concrete Structure	Staff Officer (Civil), RRL, DOH
42	Daw Theingi Min Thu	CT, Safety Control	Staff Officer, Road & Airfield Design Section, DOH

2. Japan Side

No.	Name	Organization	Position
1	Mr. NISHIGATA Kotaro	JICA Myanmar Office	Senior Representative
2	Mr. TSUDA Kota	JICA Head Office	Program Officer, Team1, Transportation and ICT Group, Infrastructure and Peacebuilding Department
3	Ms. SHOJI Mayumi	JICA Myanmar Office	Project Formulation Advisor
4	Ms. Thinzar Aung	JICA Myanmar Office	Assistant Program Officer
5	U Khin Maung	JICA Myanmar Office	Advisor
6	Mr. TANAKA Yosuke	Embassy of Japan	Second Secretary
7	Mr. MITSUISHI Akira	JICA Project Team	JICA Road and Bridge Policy Advisor
8	Mr. SENOO Kei	JICA Project Team	JICA Construction Management / Monitoring and Evaluation / Coordinator
9	Mr. OKAZAKI Akio	JICA Project Team	Team Leader / Quality Control (Concrete Material)
10	Mr. OCHIAI Eiji	JICA Project Team	Expert of Construction Supervision for Bridge Foundation
11	Ms. Tin Phyo Hlaing	JICA Project Team	JICA Staff
12	Ms. Chan Aye Hlaing	JICA Project Team	JICA Staff
13	Ms. Poe Thiri Naing	JICA Project Team	JICA Staff

The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

MINUTES OF MEETING ON 5th JOINT COORDINATION COMMITTEE (JCC) MEETING

29th November 2018

The 5th Joint Coordination Committee (hereinafter referred to as "JCC") Meeting on the Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar (hereinafter referred to as "the Project") was held on 29th November 2018 with attendance of major project counter parts representing the Ministry of Construction (MOC), representatives of JICA Myanmar Office and experts of the JICA Project Team to share the progress of activities in Stage-3 through the detailed discussion as shown in Appendix-1.

As a result of the discussions, the MOC confirmed progress of the Project through the Monitoring Sheet and the Project Design Matrix (PDM) of the Project submitted by JICA Project Team (Appendix-2), and duly received the Quality and Safety Control Manual for Road and Bridge Construction (hereinafter referred to as "the Manual").

Chair Person

U Win Tint
Permanent Secretary
Ministry of Construction, Myanmar

Vice Chair Person

U Shwe Lay
Director General
Department of Bridge
Ministry of Construction, Myanmar

U Ohn Lwin
Director General
Department of Highways
Ministry of Construction, Myanmar

Japan International Corporation Agency (JICA)

Kotaro NISHIGATA
Senior Representative
Myanmar Office, JICA

JICA Project Team

Akira MITSUISHI
Road / Bridge Policy Advisor
JICA

1. **Opening Remarks by MOC**

U Han Zaw, Union Minister, expressed his gratitude for the technical assistance project by JICA especially for providing manuals, seminars as well as training of MOC Engineers. He mentioned that the manuals developed under the Project should be widely utilized in construction industries and academic field in Myanmar to support development of road and bridge construction. In addition, it was remarked that MOC highly expected JICA to start "the Project on Capacity Development for Road and Bridge Operation and Maintenance" as early as possible.

2. **Greeting by JICA Representative**

Mr. Nishigata, Senior Representative of JICA Myanmar Office expressed his deep gratitude for cooperation of MOC to implement the Project as scheduled, and requested for continuous collaboration and support by MOC to disseminate the technology and the Manuals to relevant engineers and organizations in Stage-4. It was also highlighted the importance of technology transfer by Core Trainers (CTs) to other engineers based on training provided in Myanmar and Japan under the Project. His remark was closed with the comment that JICA and the Government of Japan would support MOC in terms of the development of road and bridge infrastructure and capacity development of human resources for sustainable socio-economic development.

3. **Progress of the Project**

Mr. Senoo, JICA Long-term Expert explained the activities performed under the Project such as workshops, seminars, OJT by CTs and JICA Experts up to Stage-3 based on the Monitoring Sheet submitted by JICA Project Team. It was confirmed that neither significant delay nor issue suspended were observed by the end of November 2018.

4. **Handing-over of the Manuals**

Daw Yin Yin Swe (CT of Concrete Structure) as a representative of CTs explained to Union Minister about the contents of the Manuals, their activities on manual development and achievements during OJT by using the manuals. Six (6) of CTs respectively handed over each manuals namely, "Quality Control Manual for Concrete Structure", "Quality Control Manual for PC Girder Bridge", "Quality Control Manual for Steel Bridge", "Quality Control Manual for Bridge Foundation", "Safety Control Manual for Road and Bridge Construction" and "Construction Management Guideline for Road and Bridge" to Union Minister.

5. **Future Schedule and Issues in Stage-4**

Mr. Okazaki, Team Leader of the Project introduced future activities for next stage (Stage-4) of

the Project to disseminate the manuals and to ensure the sustainability of the Project Effect.

<Future Schedule>

- Regional Seminars and Final Seminar shall be conducted in order to disseminate the Manuals to concerned engineers of MOC and other organizations early in 2019.
- Final examination shall be conducted for all CTs at the end of January 2019 and follow-up examination is scheduled at the end of March 2019. The Certificate for CT would be conferred to well-qualified CTs in the last JCC meeting.

<Proposal on Institutional Mechanism>

Followings were proposed to ensure the effect of the Project.

- Upgrading of Organization to manage the Manuals, to operate the Database and to discuss the Standard of MOC.
- Upgrading of System by developing the Standard Operation Procedure (SOP) for Quality Assurance, reviewing the Cost Estimate of construction work to secure the budget for Quality/Safety Control activity, and establishment of Evaluation / Awarding System of Construction Unit and Contractor.
- Continuous Capacity Development by establishing periodic training course in MOC, new qualification system in collaboration with MEC, and involvement of YTU and YCDC to the trainings.

Union Minister gave his suggestion based on Mr. Okazaki's presentation.

- Technological universities should be invited to Regional Seminars to learn the knowledges of actual construction activities.
- The Seminar shall be conducted in Mandalay, too.
- The Seminars and lecture shall be given to university students and engineers of private company through Myanmar Engineering Society (MES).

6. Report of 3rd OJT in Japan

Daw Ei Ei Nyein, Deputy Director of DOB reported their achievement of 3rd Training in Japan (October 28 to November 10, 2018). The major contents of the training and their output of the training were presented as below.

- Japanese policy, construction maintenance system and bridge database system
- Maintenance management for road and bridge structures
- Renovation of existing bridge and repainting
- Concrete technology and investigation of concrete bridge deterioration

Through the above trainings, advanced system for bridge maintenance and quality control as well as safety control in Japan were investigated and, following ideas were presented.

- Japanese Construction Management System would be shared and applied to Myanmar.
- Bridge Maintenance Management System and Construction Information System with advanced technology should be introduced to Myanmar in the future.

- Safety Control sector under MOC should be upgraded as Japan in the future.
- Road and Bridge Asset Management Review Committee is recommended to be established in the future.

7. **Introduction of Sharing Experiences and Ideas from Trainings in Japan**

Following idea was explained by Ms. Nakayama, Training Planner/ Project Coordinator to share the knowledge with MOC through the Trainings in Japan. Followings were principally agreed by CTs and JCC members.

- CTs should share their experiences not only within CTs but also to all engineers of MOC.
- A meeting to share the contents of three (3) Trainings should be held in January 2019.
- Report of Training with all materials, recorded photos and presentation data obtained from the Trainings in Japan should be shared with the management body and other engineer.

8. **Comments by JICA Long-term Expert**

Mr. MITSUISHI Akira, JICA Long-term Expert, described his comments as follow.

- Quality control and safety control manuals and guidelines would be disseminated during remaining period of the Project.
- The knowledge and precious information of CTs should be disseminated to young engineers of MOC.
- The periodic update of the manuals would be important and to be solved as organization matter.

9. **Comments by JCC Member**

- Some modification of the Manuals could be considered for nationwide utilization of the Manuals in Myanmar by removing the specific word such as "MOC", "DOB" and "DOH".
- Rules and regulations in construction management guideline for DOB are required to be made.
- Proposal on Regional Seminar and Final Examination by JICA Project Team were principally agreed with the comments by Union Minsiter.
- Concept on institutional mechanism was agreed to be discussed during Stage-4.
- Prompt starting of technical assistance on the Operation and Maintenance is expected.
- Technical transfer on Japanese modernized caisson foundation method is required.
- YCDC is ready to cooperate with JICA Team for seminar to disseminate the Manuals.

10. Comments of JICA

- The request for next technical assistance project on operation and maintenance, and the technical assistance for caisson foundation in terms of the disaster prevention for flooding were well understood.
- CTs would conduct knowledge sharing to regional engineers through manual dissemination seminar to improve regional engineers' understanding.

-END-

Appendix-3: Attendance List

1. Myanmar Side

No.	Name	Position under the Project	Department
JCC Member			
1	U Han Zaw	Chairperson	Minister of MOC
2	U Shwe Lay	Member	Director General, DOB
3	U Aung Myint Oo	Member	Deputy Director General (Planning), DOH
4	U Khin Maung Swe	Project Director	Deputy Director General (Construction), DOB
5	Daw Thein Nu	Member	Chief Engineer, DOB
6	Daw Than Yi	Member	Director, DOB
7	Daw Ei Ei Myo	Member	Director (Civil), DOH
8	U Aye Ko (U Kyin Ohnn)	Member	Assistant Chief Engineer, YCDC (Deputy Head of Department, YCDC)
Core Trainer (CT)			
9	Daw Nant Tha Hmwe	CT, Bridge Foundation	Deputy Director, Bridge Design, DOB
10	Daw Ei Htwe San	CT, Bridge Foundation	Deputy Director, Bridge Design, DOB
11	Daw Yin Yin Swe	CT, Concrete Structure	Director, Quality Control & Safety, DOB
12	Daw Myo Min Aye	CT, Concrete Structure	Assistant Director, QCS, DOB
13	Daw Cho Mar Oo	CT, Concrete Structure	Assistant Director, QCS, DOB
14	Daw Khin Moe Moe	CT, Concrete Structure	Staff Officer, QCS, DOB
15	U Soe Thiha	CT, Concrete Structure	Staff Officer, RRDS, DOH
16	Daw Thae Phyu Phyu Moe	CT, Concrete Structure	Staff Officer, RRDS, DOH
17	U Tin Mg Htwe	CT, PC Bridge	Assistant Director, New Myaung Mya Bridge Project, Construction Unit-1
18	U Thu Ra Thant	CT, PC Bridge	Staff Officer, Bridge Special Unit-4, DOB
19	Daw Theint Han Su Kyaw	CT, PC Bridge	Assistant Director, Environmental & Social Section (Minister Office's Attached), DOB
20	U Kyaw Myo	CT, Steel Bridge	Deputy Director, Bridge Special Unit-9, DOB
21	Daw Than Aye	CT, Steel Bridge	Assistant Director, Bridge Planning, DOB
22	U Shin Thant Htut	CT, Safety Control	Assistant Director, Bridge Special Unit-6,

			DOB
23	Daw Thwe Thwe Tun	CT, Safety Control	Staff Officer, Bridge Planning, DOB
24	Daw Ei Ei Nyein	CT, Database	Deputy Director, Bridge Planning, DOB
25	Daw Phyoe Thandar Win	CT, Database	Assistant Director, Bridge Planning, DOB
26	Daw Tin Thu Zar Win	CT, Database	Staff Officer, Bridge Special Unit 12, DOB
27	Daw Ei Ei Myo	CT, Construction Management	Director (Civil), QA/QC Section (Maintenance), DOH
28	Daw Sandar Win	CT, Construction Management	Deputy Director, International Relationship, DOB
29	Daw Aye Tar Tar Htut	CT, Construction Management	Assistant Director, QA/QC Section (Maintenance), DOH
30	U Soe Lwin	CT, Safety Control	Assistant Director, Road & Airfield Design Section, DOH
31	Daw Aye Aye Khaing	CT, Safety Control	Staff Officer, QA/ QC Section (Construction), DOH
32	Daw Theingi Min Thu	CT, Safety Control	Staff Officer, Road & Airfield Design Section, DOH

2. Japan Side

No.	Name	Organization	Position
1	Mr. NISHIGATA Kotaro	JICA Myanmar Office	Senior Representative
2	Ms. SHOJI Mayumi	JICA Myanmar Office	Project Formulation Advisor, Infrastructure
3	Mr. Khin Maung	JICA Myanmar Office	Advisor
4	Ms. Thinzar Aung	JICA Myanmar Office	Assistant Program Officer
5	Mr. MITSUISHI Akira	JICA Project Team	JICA Road and Bridge Policy Advisor
6	Mr. SENOO Kei	JICA Project Team	JICA Construction Management / Monitoring and Evaluation / Coordinator
7	Mr. OKAZAKI Akio	JICA Project Team	Team Leader / Quality Control (Concrete Material)
8	Mr. KUGE Takahiro	JICA Project Team	Expert of Construction Safety
9	Ms. NAKAYAMA Makiko	JICA Project Team	Training Planner/ Project Coordinator
10	Ms. Tin Phyo Hlaing	JICA Project Team	JICA Project Staff
11	Ms. Chan Aye Hlaing	JICA Project Team	JICA Project Staff
12	Ms. Poe Thiri Naing	JICA Project Team	JICA Project Staff

The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

MINUTES OF MEETING
ON
6th JOINT COORDINATION COMMITTEE (JCC) MEETING

9th April, 2019

The 6th Joint Coordination Committee (hereinafter referred to as "JCC") Meeting on the Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar (hereinafter referred to as "the Project") was held on 9th April 2019 with attendance of major project counter parts representing the Ministry of Construction (MOC), representatives of JICA Myanmar Office and experts of the JICA Project Team to share the achievement of the Project in Stage-4 (Final Stage) as well as Evaluation of the Project through the detailed discussion as shown in Appendix-1.

As a result of the discussions, the MOC confirmed progress and achievement of the Project through the Monitoring Sheet and the Project Design Matrix (PDM) submitted by JICA Project Team (Appendix-2) and it was declared that the Quality and Safety Control Manuals for Road and Bridge Construction (hereinafter referred to as "the Manual") were duly authorized by Union Minster of MOC.

Chair Person

U Win Tint
Permanent Secretary
Ministry of Construction, Myanmar

Japan International Corporation Agency (JICA)

Kotaro NISHIGATA
Senior Representative
Myanmar Office, JICA

Vice Chair Person

U Shwe Lay
Director General
Department of Bridge
Ministry of Construction, Myanmar

JICA Project Team

Akira MITSUISHI
Road / Bridge Policy Advisor
JICA

U Ohn Lwin
Director General
Department of Highways
Ministry of Construction, Myanmar

1. **Opening Remarks**

U Han Zaw, Union Minister, expressed his gratitude to JICA team for successful completion of the Project. He explained that the Manuals would be effectively utilized together with bridge inventory database for more systematic construction management of road and bridge as well as housing, building and other infrastructure sector. In this regards, it was declared by Union Minister that the Manuals were duly authorized in MOC on this day.

In addition, he explained vital issues on operation and maintenance for road and bridge. He highlighted that MOC should perform more effective maintenance to cover MOC construction projects such as Yangon inner-ring road, East-West economic corridor projects and other future expressways and bridges projects. He explained an importance to start the capacity development project for bridge and road maintenance, and necessity of long-term and short-term experts for next project.

2. **Greeting by JICA Representative**

Mr. Nishigata, Senior Representative of JICA Myanmar Office expressed his deep gratitude for strong support and great cooperation by MOC's esteemed organization to implement the Project. He mentioned that thirty-two (32) Core Trainers (CTs) would be expected to contribute to future development of MOC and Myanmar as real CTs by sharing their knowledge and experience to other colleagues as BETC Project achieved before. Finally, he encouraged utilization of opportunities brought by JICA's multiple scheme (ODA Loan, Grand Aid, and Technical Cooperation) for future development of construction sector in Myanmar.

3. **Progress and Achievement of the Project**

Mr. Senoo, JICA Long-term Expert explained activities and achievements of the Project as of final stage of the Project according to Project Completion Report and Project Monitoring Sheet Ver.6 submitted by the Project Team. In conclusion, it was presented that whole activities were performed by JICA Project Team in corroboration with MOC as scheduled, and Output-1 to Output-3 as well as Project Purpose were fully achieved through the activities described in PDM.

4. **Remark by Prof. Dr. Khin Than Yu**

Dr. Khin Than Yu, Prof. of YTU, paid her respects for the successful completion of the Project in collaboration with JICA and MOC, which achieved remarkable outcomes such as development of the Manuals and inventory database system. She hoped that those outcomes based on the collaboration and effort of CTs would stand at front line for continuous development of road and bridge in Myanmar. She requested MOC and JICA to continue

systematic nurturing support for wider coverage and deeper technology, and to keep this collaboration for nationwide and sustainable development of Myanmar.

5. Evaluation of the Project

Mr. OKAZAKI Akio, Project Team Leader explained about a result of evaluation of the Project in line with DAC Criteria introduced in Project Completion Report (draft). It was explained that the overall evaluation of the Project was evaluated as "Highly Satisfactory" based on following conclusions on evaluation of DAC criteria.

- Relevance: "Very High" because of high compatibility with policy of Myanmar and Japanese assistance as well as needs of MOC.
- Effectiveness: "High" because understanding level of CTs on technology transferred and evaluation by participants of regional seminars on manuals were good enough.
- Efficiency: "High" because efficient project operation through convination of Long/Short term experts, stage-wised target, Training of Trainer Method and smooth implementation of Pilot Project.
- Impact: "Very High" because of manual authorization, nationwide dissemination and establishment of new organization for quality control as well as practical improvement in quality and safety control at construction site.
- Sustainability: "High" in terms of policy aspect, institutional aspect and financial aspect.

In addition to the above, it was explained that the prospect to achieve the Overall Goal of the Project would be very high in view of outcomes of activities and achievement under the Project.

6. Awarding of Core Trainer's Certificate

Mr. Okazaki, Project Team Leader awarded Certificates to all CTs of Concrete Structure, PC Girder, Steel Bridge, Bridge Foundation, Safety Control, Construction Management and Bridge Inventory Database.

7. Bridge Inventory Database

Daw Ei Ei Nyein, CT of Bridge Inventory Data Base explained the functions and contents of Bridge Inventory Database, work-flow for data update and future maintenance required. She also explained that the Database System was officially handed over with 945 sample data.

8. Comments by JICA Long-term Expert

Mr. MITSUISHI Akira, JICA Long-term Expert, put his comments on the achievement of the Project as below.

- MOC needs to continuously use and to revise/update the Manuals developed under the Project.
- The Manuals shall be authorized as regulation under provision of law in Myanmar to be

utilized not only for MOC but private contractor

- Both contractor and client side shall utilize the Manuals based on mutual understanding.
- Information of Bridge Database system shall be shared with, and updated by all engineers of MOC including construction site.
- MOC needs stipulate that Design and Construction works should be based on the Manuals in his contract document.
-

9. Achievement of the overall goal of the Project

U Kyaw Kaung Cho, DDG, DOB explained that following 6 actions should be taken by MOC after the completion of the Project to achieve the Overall Goal.

<Action to be Taken by MOC after the Project>

- To provide periodic training on quality/safety control by using the Manuals to MOC engineers and to other engineers.
- To enhance surrounding condition to ensure the improvement of quality/safety (Allocation of appropriate budget, Stipulation of Role and responsibility on QC/SC in Ministry Code or Standard Operation Procedure, and Keeping construction record in Database).
- To officially appoint the section to keep, to publish and to control the Manuals
- To enforce the QC/SC by describing role and responsibility of person in charge in contract document/work order.
- To develop feed-back system to share good or bad practice on QC/SC at construction site by sharing information

In addition, following 5 items were presented by U Kyaw Kaung Cho as issues to be challenged by MOC for further improvement suggested by JICA Project Team.

<Suggestion by JICA Project team for further improvement>

- Centralization of information on engineering technology provided by other projects to effectively share the information and knowledge.
- Development of incentive mechanism for engineers and contractors to improve their capacity in QC/SC.
- Improvement of quality in design of bridge to ensure initial quality.
- Upgrading of Manuals to accommodate latest QC/SC technology after certain years.
- Appointment of fulltime database operator to ensure the data input

10. Question and Answer Session

Following question and answer were made by participants of the JCC Meeting.

- DG U Shwe Lay and DDG U Kyaw Kaung Cho showed their interest in continuous technical assistance by JICA focused on Maintenance Technology. Mr. Nishigata explained that new project has been under preparation by JICA.

- Responding to request by U Shwe Lay, Mr. Okazaki clarified his recommendation presented by U Kyaw Kaung Cho as followings.

1) Many information, manuals and knowledge provided by several technical assistance projects under JICA and other organization shall be effectively shared in MOC by centralize at appropriate section and/or department. New department for Training and Planning would be appropriate for such function.
2) Qualification system for engineers and performance evaluation system for the contractors would be good incentives to improve their capacity in quality/safety control.
3) Design technology would be one of the most important factor to improve the initial quality of infrastructure as same as construction technology.
4) Manuals shall be updated/upgraded periodically in line with construction technology in MOC.
5) Since MOC has constructed more than 100 bridges per year, update of database system will be new work load for DOB. Thus, appointment of fulltime database operator at least one (1) would be recommended to ensure this work.

- Mr. Mitsuishi supplemented his comment that MLIT Japan presented about incentive mechanism for private contractors at last vice-ministerial meeting and U Aung Myint Oo from DOH had received detailed information from MLIT to introduce such system to MOC.

11. Comments by YTU and YCDC

- Dr. Khin Than Yu (YTU) mentioned that sustainability of outcome by this Project as well as by the upcoming project would be very much important for professional implementation of every construction project, and that MOC would be recommended to make strategy to collaborate with other ministries for their capacity development.
- U Aye Ko, Assistant Chief Engineer, YCDC expressed his comment that six manuals and guideline would be surely useful and valuable for Myanmar.

12. Comments of JICA

- Mr. Nishigata highlighted the importance of keeping utilization of the Manuals, and his positive remarks about which the Manuals were applied to construction of New Myaung Mya Bridge through OJT. He mentioned an importance of collaboration framework with MOC and YTU/YCDC for future capacity development project.
- Ms. Shoji, Project Formulation Advisor mentioned that the completion of the Project would be just starting point toward the Overall Goal, and that JICA would conduct ex-post evaluation of the Project to confirm its achievement three years after the project completion.

13. Comments of MOC

U Han Zaw, Union Minister of MOC remarked about the Project such as improvement in quality and safety control at construction site after this project. He highlighted an advantage in

output of the Project such as the Manuals developed in English and Myanmar language which would help well understanding of manuals for all field engineers in Myanmar. It was also remarked that MOC would upgrade the bridge inventory database including smaller bridge data shorter than 180 feet (55m) in the near future to conduct research and survey regarding the bridges from several aspects.

14. Closing Remark

U Kyaw Linn Deputy Minister delivered his closing remark. He expressed his gratitude to JICA for long relationship with MOC by providing several projects and technical assistant through long-term and short-term experts. He also explained about importance of upgrading of Central Training Center for their sustainable capacity development to perform their duty on physical and socio-economic development in Myanmar inclusive of building sector. In conclusion, he expressed his gratitude for longstanding assistance by JICA and his anticipation for the future cooperation.

-END-

Appendix-3: Attendance List

1. Myanmar Side

No.	Name	Position under the Project	Department
JCC Member			
1	U Han Zaw	Chairperson	Minister of MOC
2	U Kyaw Linn	Vice Chairperson	Deputy Minister of MOC
3	U Win Tint	Member	Permanent Secretary, MOC
4	U Shwe Lay	Member	Director General, DOB
5	U Aung Myint Oo		Deputy Director General (Planning), DOH
6	U Khin Maung Kyaw		Deputy Director General (Maintenance), DOH
7	U Khin Maung Swe	Project Director	Deputy Director General (Construction), DOB
8	U Kyaw Kaung Cho	Member	Deputy Director General (Maintenance), DOB
9	U Thein Myint Mon	Project Manager	Chief Engineer (Planning), DOB
10	Daw Thein Nu	Member	Chief Engineer, DOB
11	Daw Htwe Nge Myint	Member	Director, International Relations & Legal Sub-Division, DOB
12	Daw Ei Ei Myo	Member	Director, Civil, DOH
13	U Kyin Ohnn	Member	Assistant Chief Engineer, YCDC (Deputy Head of Department, YCDC)
14	Dr. Khin Than Yu	Member	Pro: Rector Teaching, YTU
Core Trainer (CT)			
15	U Myo Thet Tun	CT, Bridge Foundation	Assistant Director, Bridge Special Unit-14, DOB
16	Daw Nant Tha Hmwe	CT, Bridge Foundation	Deputy Director, Bridge Design, DOB
17	Daw Ei Htwe San	CT, Bridge Foundation	Deputy Director, Bridge Design, DOB
18	Daw Yin Yin Swe	CT, Concrete Structure	Chief Engineer (Construction), DRRD
19	Daw Myo Min Aye	CT, Concrete Structure	Assistant Director, QCS, DOB
20	Daw Cho Mar Oo	CT, Concrete Structure	Assistant Director, QCS, DOB
21	Daw Khin Moe Moe	CT, Concrete Structure	Staff Officer, QCS, DOB
22	U Soe Thiha	CT, Concrete Structure	Staff Officer, RRDS, DOH

23	Daw Thae Phyu Phyu Moe	CT, Concrete Structure	Staff Officer, RRDS, DOH
24	U Tin Mg Htwe	CT, PC Bridge	Assistant Director, New Myaung Mya Bridge Project, Construction Unit-1, DOB
25	U Thu Ra Thant	CT, PC Bridge	Staff Officer, Bridge Special Unit-4, DOB
26	Daw Theint Han Su Kyaw	CT, PC Bridge	Assistant Director, Environmental & Social Section (Minister Office's Attached), DOB
27	U Kyaw Myo	CT, Steel Bridge	Deputy Director, Bridge Special Unit-9, DOB
28	Daw Than Aye	CT, Steel Bridge	Assistant Director, Bridge Planning, DOB
29	U Shin Thant Htut	CT, Safety Control	Assistant Director, Bridge Special Unit-6, DOB
30	Daw Thwe Thwe Tun	CT, Safety Control	Staff Officer, Bridge Design Section, DOB
31	Daw Ei Ei Nyein	CT, Database	Deputy Director, Bridge Planning, DOB
32	Daw Tin Thuzar Win	CT, Database	Staff Officer, Bridge Special Unit 12, DOB
33	Daw Phyoe Thandar Win	CT, Database	Assistant Director, Bridge Planning, DOB,
34	Daw Sandar Win	CT, Construction Management	Deputy Director, International Relations & Legal Sub-Division, DOB
35	Daw Ei Ei Myo	CT, Construction Management	Director (Civil), QA/QC Section (Maintenance), DOH
36	U Soe Lwin	CT, Safety Control	Assistant Director, Road & Airfield Design Section, DOH
37	Daw Aye Tar Tar Htut	CT, Construction Management	Assistant Director, QA/QC Section (Maintenance), DOH
38	Daw Moe Moe Khaing	CT, Construction Management	Assistant Director, QA/QC Section (Maintenance), DOH
39	U Ko Ko Naing	CT, Construction Management	Staff Officer (Civil), QA/QC Section (Construction), DOH
40	Daw Aye Aye Khaing	CT, Safety Control	Staff Officer, QA/ QC Section (Construction), DOH
41	Daw Su Myat Sandi Thaw	CT, Concrete Structure	Staff Officer (Civil), RRDS, DOH
42	Daw Theingi Min Thu	CT, Safety Control	Staff Officer, Road & Airfield Design Section, DOH
Members			
43	U Maung Maung Nyunt		Chief Engineer, DOB
44	U Zaw Win Myint		Chief Engineer, DOB
45	U Win Min Htut		Chief Engineer, DOB

2. Japan Side

No.	Name	Organization	Position
1	Mr. NISHIGATA Kotaro	JICA Myanmar Office	Senior Representative
2	Ms. SHOJI Mayumi	JICA Myanmar Office	Project Formulation Advisor, Infrastructure
3	Mr. Khin Maung	JICA Myanmar Office	Advisor
4	Ms. Thinzar Aung	JICA Myanmar Office	Assistant Program Officer
5	Mr. MITSUISHI Akira	JICA Project Team	JICA Exert / Road and Bridge Policy
6	Mr. SENOO Kei	JICA Project Team	JICA Expert / Construction Management
7	Mr. OKAZAKI Akio.	JICA Project Team	Team Leader
8	Mr. WATANABE Ryohei	JICA Project Team	Deputy Team Leader / Expert of Quality Control (Concrete Material)
9	Ms. NAKAYAMA Makiko	JICA Project Team	Training Planner / Project Coordinator
10	Ms. Tin Phyo Hlaing	JICA Project Team	JICA Staff
11	Mrs. Chan Aye Hlaing	JICA Project Team	JICA Staff
12	Ms. Poe Thiri Naing	JICA Project Team	JICA Staff

Appendix 5

Monitoring Sheet (Version 1 ～ Version 6)

PROJECT MONITORING SHEET

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of Myanmar
Version of the Sheet: Ver.1 (November 2016)

Name: Kei SENOO / Akio OKAZAKI
Title: JICA Long-term Expert / Team Leader
Submission Date: 3 November 2016

I. Summary

1. Progress

1-1 Progress of Inputs

[(Japan side) Short term experts]

17.33MM (Whole Project: 68MM)

[(Myanmar side) Project office]

N/A

1-2 Progress of Activities

Progress of activities is indicated in Monitoring Sheet Form 3-2 and Form 3-3.

1-3 Achievement of Output

[Output 1: Advises to a broad policy matters and technical documents on road and bridge sectors provided]

- Nothing can be done by now, because schedule of dispatch for the JICA Long-term Experts is assigned from the beginning of November.

[Output 2: The work process for quality and safety of concrete and bridge construction projects developed and enhanced]

(Activity 2-1: Investigate the current condition of the overall capacity and the work process in MOC)

- JICA project team visited the construction unit No.1 and No.4 on 7th-9th and 11th-12th June, 2016 to investigate the current work process at construction sites.
- Workshops with 2 Core Trainers (CTs) from DOB were held on 1st and 4th August, 2016 to discuss about the current work process.
- As the summary of investigations above, ‘”The Baseline Survey Report” was submitted on 21st October 2016.

(Activity 2-4: Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance)

- Development of "the Bridge Inventory system" was started in May, 2016

[Output 3: The technical documents on quality and safety control for concrete and bridge construction developed]

(Activity 3-1 Investigate the current condition of the existing technical documents of MOC)

- Investigations using questionnaires on the existing technical documents about quality and safety control were done.
- Site visit at bridge construction sites by the project team were carried out to investigate the current situation of quality and safety control at construction sites.
- Workshops for quality control manuals of "Concrete", "PC Bridge", "Steel Bridge" and "Bridge Foundation" were held from May to October 2016.
- Workshops for "concrete" quality control were held with 6 CTs from BRL and RRL on 26th and 29th July, 2016.
- Workshops for quality control of "Bridge Foundation" were held with 3 CTs on 25th, 26th and 29th in July.
- As the summary of investigations above, '"The Baseline Survey Report" was submitted on 21st October 2016.

(Activity 3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.)

- A workshop about safety control was held on 13th June, 2016 to introduce the Japanese example for safety control.

(Activity 3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction).)

- A table of contents for the technical documents on quality and safety control was proposed by JICA project team

1-4 Achievement of the Project Purpose

- PDM and Work Plan were approved by MOC at the internal meeting on 31st May, 2016.

1-5 Changes of Risks and Actions for Mitigation

N/A

1-6 Progress of Actions undertaken by JICA

- Kickoff meeting was held on 11th May, 2016.
- Internal meeting among JICA Project Team and JCC member was held on 31st May, 2016.

1-7 Progress of Actions undertaken by MOC of Myanmar

- JCC Members were nominated in the May 2016.
- Office space for JICA Project Team was provided by MOC in the May 2016.
- 23 members were selected as Core Trainers from DOB and DOH.

1-8 Progress of Environmental and Social Considerations (if applicable)

N/A

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

N/A

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

N/A

2. Delay of Work Schedule and/or Problems (if any)

2-1 Detail

A) Dispatch of the JICA long-term Experts was delayed from July to November 2016.
B) The 1st JCC was delayed from May to November 2016.
C) The 1st Training in Japan was delayed from October 2016 to April 2017.

2-2Cause

A) The procedures on the long-term experts (ex. acquisition of visa) were delayed.
B) Internal meeting were held in May, 2016 instead of the 1st JCC
C) The trainees for the training in Japan need to be selected from the CTs taking into account their capacity and adequacy by JICA project member together with the long-term Expert.

2-3 Action to be taken

A) JICA long-term experts already fixed their schedule in November.

B) The 1st JCC shall be held as soon as possible after dispatch of long-term experts.

C) The 1st training in Japan was re-scheduled in May 2017

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of Myanmar, etc.)

C) JICA long-term experts shall decide trainees and coordinate the 1st training by the end of this year

3. Modification of the Project Implementation Plan

3-1 PO

- Schedule of activities in Output-1 was modified according to schedule of the long-term experts.
- The 1st JCC was modified from May to November 2016.
- The 1st Training in Japan was modified from October 2016 to April 2017.
- All above is attached as Monitoring Sheet Form 3-3.

3-2 Other modifications on detailed implementation plan

N/A

4. Preparation of Gov. of Myanmar toward after completion of the Project

N/A

II. Project Monitoring Sheet I & II *as Attached*

Project Design Matrix

Form 3-2 PDM

Project Title: The Project for Capacity Development of Road and Bridge Technology

Version 1.0

Dated November 8, 2016

Implementing Agency: MOC

Target Group: Department of Bridges, Department of Highways

Period of Project: 3.5 years (including 0.5 year for preparation)

Project Site: Nay Pyi Taw and whole country of Myanmar

Model Site:

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Quality of bridges and concrete structures constructed or managed by MOC improved	(Within 5 years after the project completes,) 1. ~~At least XX% of the bridges and concrete structures constructed complying the technical documents.~~ All bridges and concrete structures consrtucted after the end of this Project complying the technical documents. 2. The strength, and appearance of the concrete structure built by MOC is maintained within the requirements stipulated in the technical documents.	~~List and record of bridges and road constructed~~ List and record of bridges and road constructed as well as their complying technical documents Record of bridge post completion inspection	MOC continues to revise and update the technical documents MOC support promotion and dissemination of the technical documents to construction engineers in Myanmar		
Project Purpose The capacity of MOC engineers on construction management for bridge and road construction enhanced	(Upon completion of the Project,) 1. The technical documents are distributed and ready to be used to all MOC offices. 2. The technical documents are used and applied by the state and regional offices of MOC where the pilot projects have been carried out. 3. The maintenance records of bridges constructed through the pilot projects are submitted to the MOC headquarters for monitoring.	1-1 Observation by C/P and the experts 1-2 Record of project supervision 1-3 Interview to engineers participated in the workshops/seminars 2-1 Observation by C/P and the experts 2-2 Record of project supervision 2-3 Interview to engineers participated in the workshops/ seminars 3-1 maintenance record 3-2 Observation by C/P and experts	The current policy on quality assurance for construction remain unchanged. Quality assurance activities carried out continuously after the project completes		
Outputs Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided	1-1 The advises and the recommendations to MOC are practical and provided in a timely manner 1-2 MOC increases the knowledge on selected policies and technical documents on road and bridges.	1-1 Activity reports, reports submitted to MOC, interview to C/P 1-2 List of technical documents introduced, results of post-seminar evaluation	Sufficient and accurate testing services for quality control are available in a timely manner		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced	2-1 The draft of the work process on quality and safety control for concrete and bridge construction completed, submitted and reviewed 2-2 Trainings on work process for quality and safety control of concrete and bridge construction are carried out	2-1 Draft of the work process, interviews to MOC, samples of the bridge inventory 2-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Sufficient budget for activities to ensure quality and safety control is allocated Organizational arrangement for implementation remains no significant changes		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed	3-1 The draft technical documents are completed, submitted and reviewed 3-2 Trainings on construction management for quality and safety control of concrete and bridge construction are carried out	3-1 Draft of the technical documents interview to MOC 3-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Training carried out regularly and continuously by the Myanmar side		

Activities	Inputs		Pre-Conditions
	The Japanese Side	The Myanmar Side	
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc. 1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected. 1-3 Propose prospective Japanese technical assistance for the road and bridge sectors. 1-4 Introduce Japanese technical documents through seminars. 2-1 Investigate the current condition of the overall capacity and the work process in MOC. 2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings. 2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project. 2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance. 2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes. 2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects. 2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars. 2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC. 3-1 Investigate the current condition of the existing technical documents of MOC. 3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings. 3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction). 3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s). 3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars. 3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	1. Experts (1) Long-term Experts Road / Bridge Policy Advisor Construction Management / Monitoring and Evaluation / Coordinator (2) Short-term Experts Quality control (Concrete) Quality control (Steel bridge) Quality control (PC bridge) Quality control (Foundation) Safety control Bridge Inventory / Work Process (3) Lecturers of the Seminars 2. Training in Japan 3 times (1 time / year)	1. Counterpart (1) Project Director General (2) Project Director (3) Project Manager (4) Counterpart Team Department of Bridges, MOC Department of Highways, MOC 2. Equipment and Facilities (1) Office space in the building of MOC's HQ for the Road/Bridge Policy Advisor with office furniture and utilities such as internet connection, electricity, air conditioner etc. (2) Office space in the building of MOC's HQ for other Project members with office furniture and utilities such as internet connection, electricity, air conditioner etc. 3. Local Cost Borne by the Myanmar Side (1) Trainees' and Participants' expenses of workshops/ seminars, trainings in Myanmar including travel expenses, allowance etc. (2) Construction cost of the Pilot Project(s) 4. TAG (1) Expenses of Myanmar side of TAG which is regularly held to invite relevant organizations, such as BRL, RRL, YCDC, YTU etc.	Sufficient number of counterparts with appropriate expertise are assigned to the Project

Plan of Operation

FORM 3-3 PO

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

Inputs	Expert in Charge
Expert	
Road / Bridge Policy Advisor	MITSUISHI Akira
Construction Management / Monitoring and Evaluation / Coordinator	SENOO Kei
Team Leader / Quality Control (Concrete-1)	OKAZAKI Akio
Deputy Team Leader / Quality Control (Concrete-2)	WATANABE Ryohei
Quality Control (Concrete Bridge)	MUKOYAMA Tatsuo
Quality Control (Steel Bridge)	YASUDA Masahiko
Quality Control (Foundation)	OCHIAI Eiji
Safety control	TONEGAWA Yasunori
Construction Management	ASAKURA Hajime
Bridge Inventory (1)	KUNIKATA Keigo
Bridge Inventory (2)	TSUCHIDA Takayuki
Coordinator / Training Planning	NAKAYAMA Makiko
Training in Japan	

Year: JFY2016 (I II III IV) | JFY2017 (I II III IV) | JFY2018 (I II III IV) | JFY2019 (I II III IV)

Month: 4 5 6 7 8 9 10 11 12 1 2 3 | 4 5 6 7 8 9 10 11 12 1 2 3 | 4 5 6 7 8 9 10 11 12 1 2 3 | 4 5 6 7 8 9 10 11 12 1 2 3

Plan / Actual

Remarks

Monitoring: Issue | Solution

Activities	Responsible Organization: Japan	GOM	Achievements	Issue & Countermeasures
Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided				
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc.	JICA	MOC		
1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected.	JICA	MOC		
1-3 Propose prospective Japanese technical assistance for the road and bridge sectors.	JICA	MOC		
1-4 Introduce Japanese technical documents through seminars.	JICA	MOC		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced				
2-1 Investigate the current condition of the overall capacity and the work process in MOC.	JICA	MOC		
2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.	JICA	MOC		
2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.	JICA	MOC		
2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance.	JICA	MOC		
2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes.	JICA	MOC		
2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.	JICA	MOC		
2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars.	JICA	MOC		
2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	JICA	MOC		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed				
3-1 Investigate the current condition of the existing technical documents of MOC.	JICA	MOC		
3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.	JICA	MOC		
3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction).	JICA	MOC		
3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).	JICA	MOC		
3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars.	JICA	MOC		
3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	JICA	MOC		
Duration / Phasing				

Year: 1st Year (I II III IV) | 2nd Year (I II III IV) | 3rd Year (I II III IV) | 4th Year (I II III IV)

Plan / Actual

Monitoring Plan	Remarks	Issue	Solution
Monitoring			
Joint Coordination Committee			
Set-up the Detailed Plan of Operations			
Submission of Monitoring Sheet			
Reports/Documents			
Project Completion Report			

TO CR of JICA　MYANMAR OFFICE

PROJECT MONITORING SHEET

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of Myanmar
Version of the Sheet: Ver.2 (June 2017)

Name: Kei SENOO / Akio OKAZAKI
Title: JICA Long-term Expert / Team Leader
Submission Date: 9 June 2017

I. Summary

1. Progress

1-1 Progress of Inputs

[(Japan side) Short term experts]

- 28.02MM (Whole Project: 69MM)

[(Myanmar side) Project office]

- N/A

1-2 Progress of Activities

[Output 1: Advises to a broad policy matters and technical documents on road and bridge sectors provided]

- Bridge investigation and repairing method were introduced in the workshop with Dr. Sugiura team of Kyoto Univ. in February 2017.
- Report of existing bridge investigation and bridge monitoring system were introduced in the workshop with Dr. Nagai of Tokyo Univ. in February 2017
- Road and bridge maintenance method and advanced PC technologies were introduced in SIP/SATREPS/JPCA joint seminar in March 2017.
- Japanese road and bridge policy were introduced by MLIT and Japanese expressway companies in the 1st Japan training in May 2017
- Wind tunnel test method of bridges was introduced by Dr. Shirato of Kyoto Univ. in May 2017.
- Some documents and advises were given regarding road/bridge policy, e.g. road adopt system, PPP, road design, tunnel construction, logistics master plan, upgrading of Yangon-Mandalay Expressway etc.

[Output 2: The work process for quality and safety of concrete and bridge construction projects developed and enhanced]

(Activity 2-1: 【Finished】Investigate the current condition of the overall capacity and the work process in MOC)

- "The Baseline Survey Report" was submitted in October 2016, through many site visits and MOC staff interviews.

(Activity 2-2: Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.)

- Japanese guidelines of construction management were introduced in the workshops in February 2017.
- Japanese guidelines of construction management were introduced in the 1st Japan training in May 2017

(Activity2-3: Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.)

- A table of contents of the construction management guideline was proposed by JICA project team in the workshop in February 2017.
- The draft of the construction management guideline was partially made in the workshops.

(Activity 2-4: Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance)

- Development of "the Bridge Inventory system" was started in May 2017

[Output 3: The technical documents on quality and safety control for concrete and bridge construction developed]

(Activity 3-1: 【Finished】Investigate the current condition of the existing technical documents of MOC)

- "The Baseline Survey Report" was submitted in October 2016, through many site visits and MOC staff interviews

(Activity 3-2: Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other

countries through workshops/ seminars and trainings.)

- Japanese technical documents were introduced in the workshops in February/March 2017.
- Japanese technical documents and technologies were introduced in the 1st Japan training in May 2017

(Activity 3-3: Draft technical documents on construction supervision (quality and safety control for road and bridge construction))

- A table of contents of the technical documents on quality and safety control was proposed by JICA project team in the workshops in February/March 2017.
- The draft of the technical documents on quality and safety control was partially made in the workshops.

1-3 Achievement of Output

- On going

1-4 Achievement of the Project Purpose

- On going

1-5 Changes of Risks and Actions for Mitigation

- N/A

1-6 Progress of Actions undertaken by JICA

- 2nd JCC meeting was held in June 2017

1-7 Progress of Actions undertaken by MOC

- Additional 8 members were selected as Core Trainers from DOH in June 2017.

1-8 Progress of Environmental and Social Considerations (if applicable)

- N/A

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

- N/A

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors,

NGOs etc.)

- N/A

2. Delay of Work Schedule and/or Problems (if any)

2-1 Detail

- N/A

2-2Cause

- N/A

2-3Action to be taken

- N/A

2-4Roles of Responsible Persons/Organization (JICA, Gov. of Myanmar, etc.)

- N/A

3. Modification of the Project Implementation Plan

3-1PO

- N/A

3-2 Other modifications on detailed implementation plan

- N/A

4. Preparation of Gov. of Myanmar toward after completion of the Project

- N/A

II. Monitoring Sheet Form 3-2 and Form 3-3 *as Attached*

Project Design Matrix

Project Title: The Project for Capacity Development of Road and Bridge Technology

Version 1.1

Dated June 9, 2017

Implementing Agency: MOC

Target Group: Department of Bridges, Department of Highways

Period of Project: 3.5 years (including 0.5 year for preparation)

Project Site: Nay Pyi Taw and whole country of Myanmar

Model Site:

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Quality of bridges and concrete structures constructed or managed by MOC improved	(Within 5 years after the project completes,) 1. All bridges and concrete structures consrtucted after the end of this Project complying the technical documents 2. The strength, and appearance of the concrete structure built by MOC is maintained within the requirements stipulated in the technical documents.	List and record of bridges and road constructed as well as their complying technical documents Record of bridge post completion inspection	MOC continues to revise and update the technical documents MOC support promotion and dissemination of the technical documents to construction engineers in Myanmar		
Project Purpose The capacity of MOC engineers on construction management for bridge and road construction enhanced	(Upon completion of the Project,) 1. The technical documents are distributed and ready to be used to all MOC offices. 2. The technical documents are used and applied by the state and regional offices of MOC where the pilot projects have been carried out. 3. The maintenance records of bridges constructed through the pilot projects are submitted to the MOC headquarters for monitoring.	1-1 Observation by C/P and the experts 1-2 Record of project supervision 1-3 Interview to engineers participated in the workshops/seminars 2-1 Observation by C/P and the experts 2-2 Record of project supervision 2-3 Interview to engineers participated in the workshops/ seminars 3-1 Maintenance record 3-2 Observation by C/P and experts	The current policy on quality assurance for construction remain unchanged. Quality assurance activities carried out continuously after the project completes		
Outputs Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided	1-1 The advises and the recommendations to MOC are practical and provided in a timely manner 1-2 MOC increases the knowledge on selected policies and technical documents on road and bridges.	1-1 Activity reports, reports submitted to MOC, interview to C/P 1-2 List of technical documents introduced, results of post-seminar evaluation	Sufficient and accurate testing services for quality control are available in a timely manner		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced	2-1 The draft of the work process on quality and safety control for concrete and bridge construction completed, submitted and reviewed 2-2 Trainings on work process for quality and safety control of concrete and bridge construction are carried out	2-1 Draft of the work process, interviews to MOC, samples of the bridge inventory 2-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Sufficient budget for activities to ensure quality and safety control is allocated Organizational arrangement for implementation remains no significant changes		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed	3-1 The draft technical documents are completed, submitted and reviewed 3-2 Trainings on construction management for quality and safety control of concrete and bridge construction are carried out	3-1 Draft of the technical documents interview to MOC 3-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Training carried out regularly and continuously by the Myanmar side		

Activities	Inputs		Pre-Conditions
	The Japanese Side	The Myanmar Side	
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc. 1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected. 1-3 Propose prospective Japanese technical assistance for the road and bridge sectors. 1-4 Introduce Japanese technical documents through seminars. 2-1 Investigate the current condition of the overall capacity and the work process in MOC. 2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings. 2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project. 2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance. 2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes. 2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects. 2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars. 2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC. 3-1 Investigate the current condition of the existing technical documents of MOC. 3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings. 3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction). 3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s). 3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars. 3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	1. Experts (1) Long-term Experts Road / Bridge Policy Advisor Construction Management / Monitoring and Evaluation / Coordinator (2) Short-term Experts Quality control (Concrete) Quality control (Steel bridge) Quality control (PC bridge) Quality control (Foundation) Safety control Bridge Inventory / Work Process (3) Lecturers of the Seminars 2. Training in Japan 3 times (1 time / year)	1. Counterpart (1) Project Director General (2) Project Director (3) Project Manager (4) Counterpart Team Department of Bridges, MOC Department of Highways, MOC 2. Equipment and Facilities (1) Office space in the building of MOC's HQ for the Road/Bridge Policy Advisor with office furniture and utilities such as internet connection, electricity, air conditioner etc. (2) Office space in the building of MOC's HQ for other Project members with office furniture and utilities such as internet connection, electricity, air conditioner etc. 3. Local Cost Borne by the Myanmar Side (1) Trainees' and Participants' expenses of workshops/ seminars, trainings in Myanmar including travel expenses, allowance etc. (2) Construction cost of the Pilot Project(s) 4. TAG (1) Expenses of Myanmar side of TAG which is regularly held to invite relevant organizations, such as BRL, RRL, YCDC, YTU etc.	Sufficient number of counterparts with appropriate expertise are assigned to the Project

Plan of Operation

FORM 3-3 PO

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

Inputs	Expert in Charge
Expert	
Road / Bridge Policy Advisor	MITSUISHI Akira
Construction Management / Monitoring and Evaluation / Coordinator	SENOO Kei
Team Leader / Quality Control (Concrete-1)	OKAZAKI Akio
Deputy Team Leader / Quality Control (Concrete-2)	WATANABE Ryohei
Quality Control (Concrete Bridge)	MUKOYAMA Tatsuo
Quality Control (Steel Bridge)	YASUDA Masahiko
Quality Control (Foundation)	OCHIAI Eiji
Safety control	TONEGAWA Yasunori
Construction Management	ASAKURA Hajime
Bridge Inventory (1)	KUNIKATA Keigo
Bridge Inventory (2)	TSUCHIDA Takayuki
Coordinator / Training Planning	NAKAYAMA Makiko
Training in Japan	

Year: JFY2016 (I II III IV) | JFY2017 (I II III IV) | JFY2018 (I II III IV) | JFY2019 (I II III IV)

Month: 4 5 6 7 8 9 10 11 12 1 2 3

Plan / Actual

Remarks | Monitoring: Issue | Solution

Activities	Responsible Organization: Japan	GOM	Achievements	Issue & Countermeasures
Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provide				
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc.	JICA	MOC		
1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected.	JICA	MOC		
1-3 Propose prospective Japanese technical assistance for the road and bridge sectors.	JICA	MOC		
1-4 Introduce Japanese technical documents through seminars.	JICA	MOC		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced				
2-1 Investigate the current condition of the overall capacity and the work process in MOC.	JICA	MOC		
2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.	JICA	MOC		
2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.	JICA	MOC		
2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance.	JICA	MOC		
2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes.	JICA	MOC		
2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.	JICA	MOC		
2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars.	JICA	MOC		
2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	JICA	MOC		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed				
3-1 Investigate the current condition of the existing technical documents of MOC.	JICA	MOC		
3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.	JICA	MOC		
3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction).	JICA	MOC		
3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).	JICA	MOC		
3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars.	JICA	MOC		
3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	JICA	MOC		

Year: 1st Year (I II III IV) | 2nd Year (I II III IV) | 3rd Year (I II III IV) | 4th Year (I II III IV)

Duration / Phasing — Plan / Actual

Monitoring Plan	Remarks	Issue	Solution
Monitoring			
Joint Coordination Committee			
Set-up the Detailed Plan of Operations			
Submission of Monitoring Sheet			
Reports/Documents			
Project Completion Report			

PROJECT MONITORING SHEET

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of Myanmar
Version of the Sheet: Ver.3 (Nov 2017)

Name: Kei SENOO / Akio OKAZAKI
Title: JICA Long-term Expert / Team Leader
Submission Date: 10 Nov 2017

I. Summary

1. Progress

1-1 Progress of Inputs

[(Japan side) Short term experts]

- 42.62MM (Whole Project: 72 MM); As of the end of October 2017.

[(Myanmar side) Project office]

- N/A

1-2 Progress of Activities

[Output 1: Advises to a broad policy matters and technical documents on road and bridge sectors provided]

- Lectures about road and bridge maintenance method at Thuwunna Training Center were given by experts in July 2017.
- The study tour to I&H and J&M for young MOC engineers was held by experts in August 2017.
- Advanced civil engineering technologies were introduced and regarding information was exchanged in YTU/MES/JSCE joint seminar in October 2017.
- The seminar on environmental impact assessment with Cambodia JICA team was held in October 2017.
- Some documents and advises were given regarding road/bridge policy, e.g. PPP, road design, logistics master plan, upgrading of Yangon-Mandalay Expressway, construction machinery, road/bridge numbering system, occupation of road space, general information of Japan's road and bridge maintenance, etc.

[Output 2: The work process for quality and safety of concrete and bridge

construction projects developed and enhanced]

(Activity 2-1: 【Finished】Investigate the current condition of the overall capacity and the work process in MOC)

- "The Baseline Survey Report" was submitted in October 2016, through many site visits and MOC staff interviews.

(Activity 2-2: Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.)

- Japanese guidelines of construction management were introduced in the lecture at Thuwunna training Center in July 2017.
- Construction Management based on FIDIC were introduced in the workshops in June, August, October 2017.

(Activity2-3: Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.)

- The workshops on construction management were held five (5) times.
- The draft of the construction management guideline was submitted in November 2017.

(Activity 2-4: Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance)

- Bridge data for the system has been collecting from June 2017.
- System for the Bridge Inventory Database was developed in July 2017.
- Data server of the Bridge Inventory Database was installed at MPT Data Center in August 2017.
- Workshops on how to input the data into the system were held in August 2017.
- Data-input of existing DOB bridges is ongoing to be completed by the end of 2017.

[Output 3: The technical documents on quality and safety control for concrete and bridge construction developed]

(Activity 3-1: 【Finished】 Investigate the current condition of the existing

technical documents of MOC)

- "The Baseline Survey Report" was submitted in October 2016, through many site visits and MOC staff interviews.

(Activity 3-2: Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.)

- Japanese technical documents were introduced through the Workshop for manual development in June, July, August, September, and October 2017.

(Activity 3-3: Draft technical documents on construction supervision (quality and safety control for road and bridge construction))

- The workshops on "concrete structure" were held four (4) times during June to October 2017 in Yangon.
- The workshops on "PC structure" were held five (5) times during June to October 2017.
- The workshops on "steel structure" were held six (6) times during June to October 2017.
- The workshops on "bridge foundation" were held seven (7) times during June to October 2017.
- The workshops on "safety management" were held five (5) times from June to September 2017.
- The workshops on "design examination for steel bridge" were held twelve (12) times during September to October 2017.
- The draft of the technical documents on quality and safety control was submitted in November 2017.

1-3 Achievement of Output

- On going

1-4 Achievement of the Project Purpose

- On going

1-5 Changes of Risks and Actions for Mitigation

- N/A

1-6 Progress of Actions undertaken by JICA

- 3nd JCC meeting was held in November 2017

1-7 Progress of Actions undertaken by MOC

- N/A

1-8 Progress of Environmental and Social Considerations (if applicable)

- N/A

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

- N/A

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

- N/A

2. Delay of Work Schedule and/or Problems (if any)

2-1 Detail

- 2nd Japan training was delayed from Nov 2017 to May 2018.
- Some Core Trainers could not attend some workshops.

2-2Cause

- Request from MOC.
- Core Trainers' personnel transfers.

2-3Action to be taken

- JICA HQ is arranging the schedule.
- JICA has requested MOC for special consideration for the Core Trainers to attend the left workshops.

2-4Roles of Responsible Persons/Organization (JICA, Gov. of Myanmar, etc.)

- JICA HQ
- Directors General of DOH and DOB

3. Modification of the Project Implementation Plan

3-1PO

- N/A

3-2 Other modifications on detailed implementation plan

- Assignment for technical transfer on design examination for steel bridge is added to the project. (3.0 MM in total)

4. Preparation of Gov. of Myanmar toward after completion of the Project

- N/A

II. Monitoring Sheet Form 3-2 and Form 3-3 *as Attached*

Project Design Matrix

Project Title: The Project for Capacity Development of Road and Bridge Technology

Version 2.0

Dated November 10, 2017

Implementing Agency: MOC

Target Group: Department of Bridges, Department of Highways

Period of Project: 3.5 years (including 0.5 year for preparation)

Project Site: Nay Pyi Taw and whole country of Myanmar

Model Site:

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Quality of bridges and concrete structures constructed or managed by MOC improved	(Within 5 years after the project completes,) 1. All bridges and concrete structures consrtucted after the end of this Project complying the technical documents. 2. The strength, and appearance of the concrete structure built by MOC is maintained within the requirements stipulated in the technical documents.	List and record of bridges and road constructed as well as their complying technical documents Record of bridge post completion inspection	MOC continues to revise and update the technical documents MOC support promotion and dissemination of the technical documents to construction engineers in Myanmar		
Project Purpose The capacity of MOC engineers on construction management for bridge and road construction enhanced	(Upon completion of the Project,) 1. The technical documents are distributed and ready to be used to all MOC offices. 2. The technical documents are used and applied by the state and regional offices of MOC where the pilot projects have been carried out. 3. The maintenance records of bridges constructed through the pilot projects are submitted to the MOC headquarters for monitoring.	1-1 Observation by C/P and the experts 1-2 Record of project supervision 1-3 Interview to engineers participated in the workshops/seminars 2-1 Observation by C/P and the experts 2-2 Record of project supervision 2-3 Interview to engineers participated in the workshops/ seminars 3-1 maintenance record 3-2 Observation by C/P and experts	The current policy on quality assurance for construction remain unchanged. Quality assurance activities carried out continuously after the project completes		
Outputs Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided	1-1 The advises and the recommendations to MOC are practical and provided in a timely manner 1-2 MOC increases the knowledge on selected policies and technical documents on road and bridges.	1-1 Activity reports, reports submitted to MOC, interview to C/P 1-2 List of technical documents introduced, results of post-seminar evaluation	Sufficient and accurate testing services for quality control are available in a timely manner		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced	2-1 The draft of the work process on quality and safety control for concrete and bridge construction completed, submitted and reviewed 2-2 Trainings on work process for quality and safety control of concrete and bridge construction are carried out	2-1 Draft of the work process, interviews to MOC, samples of the bridge inventory 2-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Sufficient budget for activities to ensure quality and safety control is allocated Organizational arrangement for implementation remains no significant changes		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed	3-1 The draft technical documents are completed, submitted and reviewed 3-2 Trainings on construction management for quality and safety control of concrete and bridge construction are carried out	3-1 Draft of the technical documents interview to MOC 3-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Training carried out regularly and continuously by the Myanmar side		

Activities	Inputs		Pre-Conditions
	The Japanese Side	The Myanmar Side	
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc. 1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected. 1-3 Propose prospective Japanese technical assistance for the road and bridge sectors. 1-4 Introduce Japanese technical documents through seminars.	1. Experts (1) Long-term Experts Road / Bridge Policy Advisor Construction Management / Monitoring and Evaluation / Coordinator (2) Short-term Experts Quality control (Concrete) Quality control (Steel bridge) Quality control (PC bridge) Quality control (Foundation) Safety control Bridge Inventory / Work Process Design Examination (Steel Bridge) (3) Lecturers of the Seminars 2. Training in Japan 3 times (1 time / year)	1. Counterpart (1) Project Director General (2) Project Director (3) Project Manager (4) Counterpart Team Department of Bridges, MOC Department of Highways, MOC 2. Equipment and Facilities (1) Office space in the building of MOC's HQ for the Road/Bridge Policy Advisor with office furniture and utilities such as internet connection, electricity, air conditioner etc. (2) Office space in the building of MOC's HQ for other Project members with office furniture and utilities such as internet connection, electricity, air conditioner etc. 3. Local Cost Borne by the Myanmar Side (1) Trainees' and Participants' expenses of workshops/ seminars, trainings in Myanmar including travel expenses, allowance etc. (2) Construction cost of the Pilot Project(s) 4. TAG (1) Expenses of Myanmar side of TAG which is regularly held to invite relevant organizations, such as BRL, RRL, YCDC, YTU etc.	Sufficient number of counterparts with appropriate expertise are assigned to the Project
2-1 Investigate the current condition of the overall capacity and the work process in MOC. 2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings. 2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project. 2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance. 2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes. 2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects. 2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars. 2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.			
3-1 Investigate the current condition of the existing technical documents of MOC. 3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings. 3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction). 3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s). 3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars. 3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.			

Plan of Operation

FORM 3-3 PO

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

Inputs	Expert in Charge	Year / Month	JFY2016 (4–3)	JFY2017 (4–3)	JFY2018 (4–3)	JFY2019 (4–3)	Remarks	Monitoring: Issue	Monitoring: Solution
Expert									
Road / Bridge Policy Advisor	MITSUISHI Akira	Plan / Actual							
Construction Management / Monitoring and Evaluation / Coordinator	SENOO Kei	Plan / Actual							
Team Leader / Quality Control (Concrete-1)	OKAZAKI Akio	Plan / Actual							
Deputy Team Leader / Quality Control (Concrete-2)	WATANABE Ryohei	Plan / Actual							
Quality Control (Concrete Bridge)	MUKOYAMA Tatsuo	Plan / Actual							
Quality Control (Steel Bridge)	YASUDA Masahiko	Plan / Actual							
Quality Control (Foundation)	OCHIAI Eiji	Plan / Actual							
Safety control	TONEGAWA Yasunori	Plan / Actual							
Construction Management	ASAKURA Hajime	Plan / Actual							
Bridge Inventory (1)	KUNIKATA Keigo / Mr. Kyaw Moe Aung	Plan / Actual							
Bridge Inventory (2)	TSUCHIDA Takayuki	Plan / Actual							
Design Examination (Steel Bridge)	TAKAGI Nobuhiko	Plan / Actual							
Coordinator / Training Planning	NAKAYAMA Makiko	Plan / Actual							
Training in Japan		Plan / Actual							

Activities	Plan / Actual	1st Year	2nd Year	3rd Year	4th Year	Responsible Organization: Japan	Responsible Organization: GOM	Achievements	Issue & Countermeasures
Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided									
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc.	Plan / Actual					JICA	MOC		
1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected.	Plan / Actual					JICA	MOC		
1-3 Propose prospective Japanese technical assistance for the road and bridge sectors.	Plan / Actual					JICA	MOC		
1-4 Introduce Japanese technical documents through seminars.	Plan / Actual					JICA	MOC		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced									
2-1 Investigate the current condition of the overall capacity and the work process in MOC.	Plan / Actual					JICA	MOC		
2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.	Plan / Actual					JICA	MOC		
2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.	Plan / Actual					JICA	MOC		
2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance.	Plan / Actual					JICA	MOC		
2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes.	Plan / Actual					JICA	MOC		
2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.	Plan / Actual					JICA	MOC		
2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars.	Plan / Actual					JICA	MOC		
2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	Plan / Actual					JICA	MOC		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed									
3-1 Investigate the current condition of the existing technical documents of MOC.	Plan / Actual					JICA	MOC		
3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.	Plan / Actual					JICA	MOC		
3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction).	Plan / Actual					JICA	MOC		
3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).	Plan / Actual					JICA	MOC		
3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars.	Plan / Actual					JICA	MOC		
3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	Plan / Actual					JICA	MOC		
Duration / Phasing	Plan / Actual								

Monitoring Plan	Plan / Actual	1st Year	2nd Year	3rd Year	4th Year	Remarks	Issue	Solution
Monitoring								
Joint Coordination Committee	Plan / Actual							
Set-up the Detailed Plan of Operations	Plan / Actual							
Submission of Monitoring Sheet	Plan / Actual							
Reports/Documents								
Project Completion Report	Plan / Actual							

TO CR of JICA MYANMAR OFFICE

PROJECT MONITORING SHEET

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of Myanmar
Version of the Sheet: Ver.4 (June 2018) (added with red letters)

Name: Kei SENOO / Akio OKAZAKI
Title: JICA Long-term Expert / Team Leader
Submission Date: 27 August 2018

I. Summary

1. Progress

1-1 Progress of Inputs

[Japan side]

- Short term experts: 2 persons (from November 2016)
- Short term experts: 50.32MM (Whole Project: 72.4 MM)

[Myanmar side]

- 2 Project offices

1-2 Progress of Activities

[Output 1: Advises to a broad policy matters and technical documents on road and bridge sectors provided]

- Japanese policies and technologies are introduced at 4th and 5th Myanmar-Japan Vice-Ministerial Level Meeting in March 2017 and March 2018
- Lectures about road and bridge maintenance method at Thuwunna Training Center were given by experts in July 2017 and May 2018.
- Advanced civil engineering technologies were introduced and regarding information was exchanged in YTU/MES/JSCE joint seminar in October 2017.
- The seminar on environmental impact assessment with Cambodia JICA team was held in October 2017.
- Seminar on PPP for road development was held in February 2018
- Cambodia study tour on road and bridge policy matters was held in March 2018.
- Technical advices were given for Myaungmya bridge accident in April.

- Japanese suspension bridge inspection team was organized and joined by JICA experts in May 2018.
- Japanese road development scheme was introduced at “PPP Workshop for Myanmar Toll Roads” in June 2018
- Documents and advices were given regarding road/bridge policy and technology such as PPP, road design, logistics master plan, upgrading of Yangon-Mandalay Expressway, construction machinery, road/bridge numbering system, occupation of road space, silent piling technology, wind tunnel testing, bridge painting system, general information of Japan’s road and bridge maintenance, etc.

[Output 2: The work process for quality and safety of concrete and bridge construction projects developed and enhanced]

(Activity 2-1: 【Finished】Investigate the current condition of the overall capacity and the work process in MOC)

- “The Baseline Survey Report” was submitted in October 2016, through many site visits and MOC staff interviews.

(Activity 2-2: 【Ongoing】Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.)

- Japanese guidelines of construction management were introduced in the lecture at Thuwunna training Center in July 2017.
- Construction Management based on FIDIC were introduced in the workshops in June, August, October 2017.

(Activity2-3: 【Ongoing】Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.)

- The workshops on construction management were held seven (7) times.
- The draft of the construction management guideline was submitted in November 2017 and is scheduled to be finalized throughout the pilot project and approved officially in November 2018.

(Activity 2-4: 【Ongoing】Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance)

- Bridge data for the system has been collecting from June 2017.
- System for the Bridge Inventory Database was developed in July 2017.
- Data server of the Bridge Inventory Database was installed at MPT Data Center in August 2017.
- Workshops on how to input the data into the system were held in August 2017.
- Data-input of bridge basic information is completed in February 2018
- Data-input of additional information such as drawings and completion report is scheduled to be completed in August 2018.
- The system is scheduled to be used officially in November 2018.

(Activity 2-5: 【Ongoing】Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects complete.

- The draft of the procedures was submitted in June 2018 and is scheduled to be finalized and approved officially in November 2018.

(Activity 2-6: 【Ongoing】Carry out on-the job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.

- On-the job training using pilot project results was held in June 2018.

(Activity 2-7: 【Not yet】Distribute the guideline and procedures to relevant organizations / officers / engineers through workshops/seminars

- Not yet

(Activity 2-8: 【Ongoing】Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.

- Monitoring sheet was reported and officially approved by every JCC meeting.

[Output 3: The technical documents on quality and safety control for concrete and bridge construction developed]

(Activity 3-1: 【Finished】Investigate the current condition of the existing technical documents of MOC)

- “The Baseline Survey Report” was submitted in October 2016, through many site visits and MOC staff interviews.

(Activity 3-2: 【Ongoing】Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.)

- Japanese technical documents were introduced through the Workshops for manual development

(Activity 3-3: 【Ongoing】Draft technical documents on construction supervision (quality and safety control for road and bridge construction))

- The workshops on “concrete structure” were held fourteen (14) times.
- The workshops on “PC structure” were held twelve (12) times.
- The workshops on “steel structure” were held nineteen (19) times.
- The workshops on “bridge foundation” were held twenty three (23) times.
- The workshops on “safety management” were held five (5) times.
- The workshops on “design examination for steel bridge” were held twenty three (23) times.
- The draft of the technical documents on quality and safety control was submitted in November 2017 and is scheduled to be finalized throughout the pilot project and approved officially in November 2018.

(Activity 3-4: 【Ongoing】Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).

- On-the job training of “concrete structure” at pilot project site was held in February and March 2018.
- On-the job training of “PC structure” at pilot project site was held from January to March 2018.
- On-the job training of “steel structure” at pilot project site was held in March and April 2018.
- On-the job training of “bridge foundation” at pilot project site was held from January to March 2018.
- On-the job training of “safety management” at pilot project site was held from February to April 2018.

(Activity 3-5: 【Not yet】Distribute the technical documents to the relevant organizations / officers / engineers through workshops / seminars.

(Activity 3-6: 【Ongoing】Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.

- Monitoring sheet was reported and officially approved by every JCC meeting.

1-3 Achievement of Output

- Activities 2-1 and 3-1 was finished in November 2017.

1-4 Achievement of the Project Purpose

- On going

1-5 Changes of Risks and Actions for Mitigation

- N/A

1-6 Progress of Actions undertaken by JICA

- JICA Experts reported progress of the Project and proposed countermeasures against issues on the Project at the JCC Meetings.
- Trainings in Japan were conducted for two (2) times. Effective plans and schedules for the training were organized by JICA Experts.
- Workshops and seminars for quality and safety control, PPP as well as construction management were taken place.
- Draft of the Technical Documents such as Quality and Safety Control Manual and Construction Management Guideline were developed and submitted in November 2017. These documents were reviewed through pilot project and comments by MOC.
- On-the job trainings and site investigations for improving project results were conducted.

1-7 Progress of Actions undertaken by MOC

- JCC meetings were organized four (4) times (the 4th meeting was in June 2018). MOC organized and chaired the meetings and showed issues on the Project.
- The Core Trainers (CTs) participated in trainings in Japan and reported their actively to share their findings at the trainings at JCC Meeting. The achievement of the 2nd training was introduced and shared by CTs in June 2018. Especially at the 2nd training, the CTs really regarded Myanmar's issues and deeply discussed the countermeasure to be taken by MOC based on information got in Japan.
- CTs and MOC officers actively participated in the workshops, seminars, on-the job trainings and site investigations.

- MOC selected the CTs appropriate to the Project.
- CTs voluntary shared information and knowledge learned from the Project with newly participated CTs for their smooth understanding.
- MOC selected the site of Pilot Project and arranged budget for them in December 2017.
- The CTs introduced the achievements of the Pilot Project to MOC in June 2018.
- MOC extended the draft manuals to Construction Units to collect their comments. The CTs gave lectures and exchanged opinion how to apply the manuals with MOC engineers and revised them.
- MOC planned to organize the Technological Examination Committees to authorize the manuals to be submitted by JICA Project Team.

1-8 Progress of Environmental and Social Considerations (if applicable)

- N/A

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

- N/A

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

- N/A

2. Delay of Work Schedule and/or Problems (if any)

2-1 Detail

- 2nd Japan training was delayed from Nov 2017 to May 2018.
- Some Core Trainers could not attend some workshops.

2-2Cause

- Request from MOC.
- Core Trainers' personnel transfers.

2-3Action to be taken

- JICA HQ is arranging the schedule.
- JICA has requested MOC for special consideration for the Core Trainers to attend the left workshops and additional workshops was held for them to catch up.

2-4Roles of Responsible Persons/Organization (JICA, Gov. of Myanmar, etc.)

- JICA HQ
- Directors General of DOH and DOB and JICA project team

3. Modification of the Project Implementation Plan

3-1PO

- N/A

3-2 Other modifications on detailed implementation plan

- Assignment for technical transfer on design examination for steel bridge was added to the project. (3.0 MM)
- Assignment for a road PPP expert was added to the project. (0.4 MM)

4. Preparation of Gov. of Myanmar toward after completion of the Project

- N/A

II. Monitoring Sheet Form 3-2 and Form 3-3　*as Attached*

Project Design Matrix

Project Title: The Project for Capacity Development of Road and Bridge Technology

Version 3.0

Dated June 20, 2018

Implementing Agency: MOC

Target Group: Department of Bridges, Department of Highways

Period of Project: 3.5 years (including 0.5 year for preparation)

Project Site: Nay Pyi Taw and whole country of Myanmar

Model Site:

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Quality of bridges and concrete structures constructed or managed by MOC improved	(Within 5 years after the project completes,) 1. All bridges and concrete structures consrtucted after the end of this Project complying the technical documents. 2. The strength, and appearance of the concrete structure built by MOC is maintained within the requirements stipulated in the technical documents.	List and record of bridges and road constructed as well as their complying technical documents Record of bridge post completion inspection	MOC continues to revise and update the technical documents MOC support promotion and dissemination of the technical documents to construction engineers in Myanmar		
Project Purpose The capacity of MOC engineers on construction management for bridge and road construction enhanced	(Upon completion of the Project,) 1. The technical documents are distributed and ready to be used to all MOC offices. 2. The technical documents are used and applied by the state and regional offices of MOC where the pilot projects have been carried out. 3. The maintenance records of bridges constructed through the pilot projects are submitted to the MOC headquarters for monitoring.	1-1 Observation by C/P and the experts 1-2 Record of project supervision 1-3 Interview to engineers participated in the workshops/seminars 2-1 Observation by C/P and the experts 2-2 Record of project supervision 2-3 Interview to engineers participated in the workshops/ seminars 3-1 maintenance record 3-2 Observation by C/P and experts	The current policy on quality assurance for construction remain unchanged. Quality assurance activities carried out continuously after the project completes		
Outputs Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided	1-1 The advises and the recommendations to MOC are practical and provided in a timely manner 1-2 MOC increases the knowledge on selected policies and technical documents on road and bridges.	1-1 Activity reports, reports submitted to MOC, interview to C/P 1-2 List of technical documents introduced, results of post-seminar evaluation	Sufficient and accurate testing services for quality control are available in a timely manner		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced	2-1 The draft of the work process on quality and safety control for concrete and bridge construction completed, submitted and reviewed 2-2 Trainings on work process for quality and safety control of concrete and bridge construction are carried out	2-1 Draft of the work process, interviews to MOC, samples of the bridge inventory 2-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Sufficient budget for activities to ensure quality and safety control is allocated Organizational arrangement for implementation remains no significant changes		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed	3-1 The draft technical documents are completed, submitted and reviewed 3-2 Trainings on construction management for quality and safety control of concrete and bridge construction are carried out	3-1 Draft of the technical documents interview to MOC 3-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Training carried out regularly and continuously by the Myanmar side		

Activities	Inputs		Pre-Conditions
	The Japanese Side	The Myanmar Side	
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc. 1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected. 1-3 Propose prospective Japanese technical assistance for the road and bridge sectors. 1-4 Introduce Japanese technical documents through seminars.	1. Experts (1) Long-term Experts Road / Bridge Policy Advisor Construction Management / Monitoring and Evaluation / Coordinator (2) Short-term Experts Quality control (Concrete) Quality control (Steel bridge) Quality control (PC bridge) Quality control (Foundation) Safety control Bridge Inventory / Work Process Design Examination (Steel Bridge) PPP Road Policy (3) Lecturers of the Seminars 2. Training in Japan 3 times (1 time / year)	1. Counterpart (1) Project Director General (2) Project Director (3) Project Manager (4) Counterpart Team Department of Bridges, MOC Department of Highways, MOC 2. Equipment and Facilities (1) Office space in the building of MOC's HQ for the Road/Bridge Policy Advisor with office furniture and utilities such as internet connection, electricity, air conditioner etc. (2) Office space in the building of MOC's HQ for other Project members with office furniture and utilities such as internet connection, electricity, air conditioner etc. 3. Local Cost Borne by the Myanmar Side (1) Trainees' and Participants' expenses of workshops/ seminars, trainings in Myanmar including travel expenses, allowance etc. (2) Construction cost of the Pilot Project(s) 4. TAG (1) Expenses of Myanmar side of TAG which is regularly held to invite relevant organizations, such as BRL, RRL, YCDC, YTU etc.	Sufficient number of counterparts with appropriate expertise are assigned to the Project
2-1 Investigate the current condition of the overall capacity and the work process in MOC. 2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings. 2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project. 2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance. 2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes. 2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects. 2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars. 2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.			
3-1 Investigate the current condition of the existing technical documents of MOC. 3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings. 3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction). 3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s). 3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars. 3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.			

Plan of Operation

FORM 3-3 PO

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

Inputs	Expert in Charge	Year	JFY2016				JFY2017				JFY2018				JFY2019				Remarks	Monitoring: Issue	Monitoring: Solution
			I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
		Month	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6	7 8 9	10 11 12	1 2 3			
Expert																					
Road / Bridge Policy Advisor	MITSUISHI Akira	Plan																			
		Actual																			
Construction Management / Monitoring and Evaluation / Coordinator	SENOO Kei	Plan																			
		Actual																			
Team Leader / Quality Control (Concrete-1)	OKAZAKI Akio	Plan																			
		Actual																			
Deputy Team Leader / Quality Control (Concrete-2)	WATANABE Ryohei	Plan																			
		Actual																			
Quality Control (Concrete Bridge)	MUKOYAMA Tatsuo	Plan																			
		Actual																			
Quality Control (Steel Bridge)	YASUDA Masahiko	Plan																			
		Actual																			
Quality Control (Foundation)	OCHIAI Eiji	Plan																			
		Actual																			
Safety control	TONEGAWA Yasunori / KUGE Takahiro	Plan																			
		Actual																			
Construction Management	ASAKURA Hajime	Plan																			
		Actual																			
Bridge Inventory (1)	KUNIKATA Keigo / Mr. Kyaw Moe Aung	Plan																			
		Actual																			
Bridge Inventory (2)	TSUCHIDA Takayuki	Plan																			
		Actual																			
Design Examination (Steel Bridge)	TAKAGI Nobuhiko	Plan																			
		Actual																			
PPP Road Policy	MINATO Takayuki	Plan																			
		Actual																			
Coordinator / Training Planning	NAKAYAMA Makiko	Plan																			
		Actual																			
Training in Japan																					
		Plan																			
		Actual																			

Activities	Year	1st Year				2nd Year				3rd Year				4th Year				Responsible Organization: Japan	Responsible Organization: GOM	Achievements	Issue & Countermeasures
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV				
	Month	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6	7 8 9	10 11 12	1 2 3				
Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided																					
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc.	Plan																	JICA	MOC		
	Actual																				
1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected.	Plan																	JICA	MOC		
	Actual																				
1-3 Propose prospective Japanese technical assistance for the road and bridge sectors.	Plan																	JICA	MOC		
	Actual																				
1-4 Introduce Japanese technical documents through seminars.	Plan																	JICA	MOC		
	Actual																				
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced																					
2-1 Investigate the current condition of the overall capacity and the work process in MOC.	Plan																	JICA	MOC		
	Actual																				
2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.	Plan																	JICA	MOC		
	Actual																				
2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.	Plan																	JICA	MOC		
	Actual																				
2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance.	Plan																	JICA	MOC		
	Actual																				
2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes.	Plan																	JICA	MOC		
	Actual																				
2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.	Plan																	JICA	MOC		
	Actual																				
2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars.	Plan																	JICA	MOC		
	Actual																				
2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	Plan																	JICA	MOC		
	Actual																				
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed																					
3-1 Investigate the current condition of the existing technical documents of MOC.	Plan																	JICA	MOC		
	Actual																				
3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.	Plan																	JICA	MOC		
	Actual																				
3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction).	Plan																	JICA	MOC		
	Actual																				
3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).	Plan																	JICA	MOC		
	Actual																				
3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars.	Plan																	JICA	MOC		
	Actual																				
3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	Plan																	JICA	MOC		
	Actual																				
Duration / Phasing	Plan																				
	Actual																				

Monitoring Plan	Year	1st Year				2nd Year				3rd Year				4th Year				Remarks	Issue	Solution
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
Monitoring																				
Joint Coordination Committee	Plan	▲		▲		▲		▲		▲		▲		▲						
	Actual			△			△	△		△										
Set-up the Detailed Plan of Operations	Plan	▲																		
	Actual			△																
Submission of Monitoring Sheet	Plan	▲		▲		▲		▲		▲		▲		▲						
	Actual			△		△		△		△										
Reports/Documents																				
Project Completion Report	Plan														▲					
	Actual																			

TO CR of JICA　MYANMAR OFFICE

PROJECT MONITORING SHEET

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of Myanmar

Version of the Sheet: Ver.5 (November 2018) (revised with red letters)

Name: Kei SENOO / Akio OKAZAKI
Title: JICA Long-term Expert / Team Leader
Submission Date: 29 November 2018

I. Summary

1. Progress

1-1 Progress of Inputs

[Japan side]

- Long-term Experts: 2 persons (from November 2016)
- Short-term Experts: 61.08MM (Whole Project: 73.20 MM)

[Myanmar side]

- 2 Project offices

1-2 Progress of Activities

[Output 1: Advises to a broad policy matters and technical documents on road and bridge sectors provided]

(Activities 1-1 ~ 1-4: 【Ongoing】)

- Japanese policies and technologies are introduced at 4th and 5th Myanmar-Japan Vice-Ministerial Level Meeting in March 2017 and March 2018
- Advanced PC Bridge technologies were introduced and regarding information was exchanged in JPCI joint seminar in March 2017, and October 2018.
- Lectures about road and bridge maintenance method at Thuwunna Training Centre were given by JICA Experts in July 2017, May 2018, and November 2018.
- Advanced civil engineering technologies were introduced and regarding information was exchanged in YTU/MES/JSCE joint seminar in October 2017
- The seminar on environmental impact assessment with Cambodia JICA team was

held in October 2017.

- Seminar on PPP for road development was held in February 2018
- Cambodia study tour on road and bridge policy matters was held in March 2018.
- Technical advices were given for Myaungmya Bridge accident in April 2018
- Japanese suspension bridge inspection team was organized and joined by JICA Experts in May and June 2018.
- Japanese road development scheme was introduced at “PPP Workshop for Myanmar Toll Roads” in June 2018.
- Thuwunna Training Centre upgrading outline were introduced in YTU/MES/JSCE joint seminar in June 2018.
- Bridge maintenance technology was introduced by Joint Seminar of MOC/Tokyo Univ. in September 2018.
- Hydrological technology for planning and designing bridges was transferred in the hydrological seminar in November 2018.
- Documents and advices were given regarding road/bridge policy and technology such as PPP, road design, logistics master plan, upgrading of Yangon-Mandalay Expressway, construction machinery, road/bridge numbering system, occupation of road space, silent piling technology, wind tunnel testing, bridge painting system, general information of Japan’s road and bridge maintenance, developing of Yangon Elevated Expressway, dispute board, road safety improvement with ADB and other Japanese company, etc.
- Documents and advices were given in cooperation with other JICA projects such as Dawbon Bridge Project, Bago River Bridge Project, EWEC Phase I (Gyaing Kawkareik, Gyaing Zathapyin, and Atran Bridge) Project, EWEC Phase II (Sittang River Bridge) Project, Thilawa Access Road Project, Yangon Outer Ring Road, Road Construction and Maintenance Equipment Provision Project, Projects of partnerships with Private-Sector Activities, SATREPS Project, and EEHE Project.

[Output 2: The work process for quality and safety of concrete and bridge construction projects developed and enhanced]

(Activity 2-1: 【Finished】Investigate the current condition of the overall capacity and the work process in MOC)

- “The Baseline Survey Report” was submitted in October 2016, through many site visits and MOC staff interviews.

(Activity 2-2: 【Ongoing】Introduce the outlines of construction management

and the work process in Japan or other countries through workshops/seminars and trainings.)

- Japanese guidelines of construction management were introduced in the lecture at Thuwunna Training Centre in July 2017.
- Construction Management based on FIDIC were introduced in the workshops in June, August, October 2017.

(Activity2-3: 【Finished】Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.)

- The workshops on construction management were held eight (8) times.
- The draft of the construction management guideline was submitted in November 2017
- Construction management guideline was revised by CTs throughout the pilot project and confirmed by DOH and DOB. The Guideline was finalized after incorporating the comments from DOB and DOH in November 2018.

(Activity 2-4: 【Ongoing】Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance)

- Bridge data for the system has been collecting from June 2017.
- System for the Bridge Inventory Database was developed in July 2017.
- Data server of the Bridge Inventory Database was installed at MPT Data Center in August 2017.
- Workshops on how to input the data into the system were held in August 2017.
- Data-input of bridge basic information is completed in February 2018
- Data-input of additional information such as drawings and completion report were completed in November 2018.
- Some minor modifications in the system have been requested by CTs for actual use for MOC in November 2018. These requests are discussed and incorporated to the current system during Stage-4 of the Project.

(Activity 2-5: 【Ongoing】Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects complete.

- The draft of the procedures was submitted in June 2018.
- Hand-over procedure work flow was introduced in construction management

guideline submitted in November 2018.

- Practical operation of the Hand-over procedure work flow would be carried out during stage 4.

(Activity 2-6: 【Finished】Carry out on-the job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.

- On-the job training using pilot project was held in June 2018.

(Activity 2-7: 【Ongoing】Distribute the guideline and procedures to relevant organizations / officers / engineers through workshops/seminars

- Construction management guideline is scheduled to be distributed throughout seminar or training to the relevant organization during stage 4.

(Activity 2-8: 【Ongoing】Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.

- Monitoring sheet was reported and officially approved by every JCC meeting.

[Output 3: The technical documents on quality and safety control for concrete and bridge construction developed]

(Activity 3-1: 【Finished】Investigate the current condition of the existing technical documents of MOC)

- "The Baseline Survey Report" was submitted in October 2016, through many site visits and MOC staff interviews.

(Activity 3-2: 【Ongoing】Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.)

- Japanese technical documents were introduced through the Workshops for manual development
- Other ASEAN countries' technical documents were also introduced through meetings in MOC.

(Activity 3-3: 【Finished】Draft technical documents on construction supervision

(quality and safety control for road and bridge construction))

- The workshops on “concrete structure” were held fifteen (15) times.
- The workshops on “PC structure” were held thirteen (13) times.
- The workshops on “steel structure” were held fifteen (15) times.
- The workshops on “bridge foundation” were held twenty three (23) times.
- The workshops on “safety management” were held seventeen (17) times.
- The workshops on “design examination for steel bridge” were held twenty one (21) times.
- The draft of Quality and Safety Control Manual was submitted in November 2017
- Quality and Safety Control Manual were revised by CTs throughout the pilot project and confirmed by DOB and DOH. The manuals were finalized after incorporating the comments from DOB and DOC in November 2018.

(Activity 3-4: 【Finished】Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).

- On-the job training of “concrete structure” at pilot project site was held in February, March, and October 2018.
- On-the job training of “PC structure” at pilot project site was held from January to March 2018.
- On-the job training of “steel structure” at pilot project site was held in March and April 2018.
- On-the job training of “bridge foundation” at pilot project site was held from January to March 2018.
- On-the job training of “safety management” at pilot project site was held from February to April 2018.

(Activity 3-5: 【Ongoing】Distribute the technical documents to the relevant organizations / officers / engineers through workshops / seminars.

- Quality and Safety Control Manual were scheduled to be distributed throughout seminar or training to the relevant organization during stage 4.
- Quality and Safety Control Manual shall be introduced whole MOC reginal offices as well as relevant organization during Stage-4 of the Project.

(Activity 3-6: 【Ongoing】Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.

- Monitoring sheet was reported and officially approved by every JCC meeting.

1-3 Achievement of Output

[Output 1: Advises to a broad policy matters and technical documents on road and bridge sectors provided]

(Verifiable Indicator 1-1: 【Ongoing】The advises and the recommendations to MOC are practical and provided in a timely manner**)**

- The advices have been given timely regarding road/bridge policy and technology according to MOC request.

(Verifiable Indicator 1-2: 【Ongoing】MOC increases the knowledge on selected policies and technical documents on road and bridges.)

- Policies and technical Documents have been given through seminars and workshops.

[Output 2: The work process for quality and safety of concrete and bridge construction projects developed and enhanced]

(Verifiable Indicator 2-1: 【Finished】the draft of the work process on quality and safety control for concrete and bridge construction completed, submitted and reviewed

- Confirmation of construction management guideline itself
- Confirmation by means of interviews to MOC
- Confirmation by samples of the bridge inventory

(Verifiable Indicator 2-2: 【Ongoing】Trainings on work process for quality and safety control of concrete and bridge construction are carried out

- Workshops and OJTs were implemented for Construction management.
- CTs shall be trained through Regional Seminars by playing a role of a Trainer in Stage-4.
- Final Examination is scheduled in the Stage-4 to certify the capacity of CTs.

[Output 3: The technical documents on quality and safety control for concrete and bridge construction developed]

(Verifiable Indicator 3-1: 【**Finished**】The draft technical documents are completed, submitted and reviewed

- Confirmation quality and safety control manual itself
- Confirmation by means of interviews to MOC

(Verifiable Indicator 3-2: 【**Ongoing**】Trainings on construction management for quality and safety control of concrete and bridge construction are carried out

- Workshops and OJTs were implemented for Concrete Structure, PC-Girder, Steel Bridge, Bridge Foundation and Construction Safety.
- CTs shall be trained through Regional Seminars by playing a role of a Trainer in Stage-4.
- Final Examination is scheduled in the Stage-4 to certify the capacity of CTs.

1-4 Achievement of the Project Purpose

- On going

1-5 Changes of Risks and Actions for Mitigation

- N/A

1-6 Progress of Actions undertaken by JICA

- JICA Experts reported progress of the Project and proposed countermeasures against issues on the Project at the JCC Meetings.
- Trainings in Japan were conducted for three (3) times. Effective plans and schedules for the training were organized by JICA Experts.
- Workshops and seminars for quality and safety control, PPP as well as construction management were taken place.
- On-the job trainings and site investigations for improving project results were conducted.
- Other ASEAN Manuals and guidelines were provided as reference for MOC to compare the contents of manuals and guideline developed under this Project.
- JICA Experts plan to give some proposals to make the transferred technology more effective by reflecting Myanmar construction situation including MOC reorganization.

1-7 Progress of Actions undertaken by MOC

- JCC meetings were organized four (5) times. MOC organized and chaired the

meetings and showed issues on the Project.

- The Core Trainers (CTs) have already shared knowledge and technology from the project at the lectures at Thuwanna Training Centre for young MOC engineers.
- CTs participated in trainings in Japan and reported their activities to share their findings at the trainings not only at JCC Meeting but also small discussion to MOC engineers. CTs really regarded Myanmar's issues and deeply discussed the countermeasure to be taken by MOC based on information got in Japan.
- CTs and MOC officers actively participated in the workshops, seminars, on-the job trainings and site investigations.
- MOC selected the CTs appropriate to the Project.
- CTs voluntary shared information and knowledge learned from the Project with newly participated CTs for their smooth understanding.
- MOC selected the site of Pilot Project and arranged budget for them in December 2017.
- CTs introduced the achievements of the Pilot Project to MOC in June 2018.
- MOC extended the draft manuals to Construction Units to collect their comments. CTs gave lectures and exchanged opinion how to apply the manuals with MOC engineers and revised them.
- MOC checked the guideline and manual submitted by JICA Project Team.

1-8 Progress of Environmental and Social Considerations (if applicable)

- N/A

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

- N/A

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

- N/A

2. Delay of Work Schedule and/or Problems (if any)

2-1 Detail

- 2nd Japan training was delayed from Nov 2017 to May 2018.
- Some Core Trainers could not attend some workshops.
- Some delay of data input in the bridge inventory data base system

➢ **Cause**

- Request from MOC.
- Core Trainers' personnel transfers.
- Some of existing bridge data such as drawings and reports were missed.

➢ **Action to be taken**

- JICA HQ is arranging the schedule.
- JICA has requested MOC for special consideration for CTs to attend the left workshops and additional workshops was held for them to catch up.
- CTs of data base continue hard to input data with JICA project team support, and data input is to be completed by the end of December 2018.

➢ **Roles of Responsible Persons/Organization (JICA, Gov. of Myanmar, etc.)**

- JICA HQ
- Directors General of DOH and DOB and JICA project team
- Directors General of DOB and JICA project team

3. Modification of the Project Implementation Plan

➢ **PO**

- N/A

3-2 Other modifications on detailed implementation plan

- Assignment for technical transfer on design examination for steel bridge was added to the project. (3.0 MM)
- Assignment for a road PPP expert was added to the project. (0.4 MM)
- Assignment for hydrological experts was added to the project. (0.81 MM)

4. Preparation of Gov. of Myanmar toward after completion of the Project

- N/A

II. Monitoring Sheet Form 3-2 and Form 3-3 *as Attached*

Project Design Matrix

Form 3-2 PDM

Project Title: The Project for Capacity Development of Road and Bridge Technology

Version 4.0

Dated November 29, 2018

Implementing Agency: MOC

Target Group: Department of Bridges, Department of Highways

Period of Project: 3.5 years (including 0.5 year for preparation)

Project Site: Nay Pyi Taw and whole country of Myanmar

Model Site:

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Quality of bridges and concrete structures constructed or managed by MOC improved	(Within 5 years after the project completes,) 1. All bridges and concrete structures consrtucted after the end of this Project complying the technical documents. 2. The strength, and appearance of the concrete structure built by MOC is maintained within the requirements stipulated in the technical documents.	List and record of bridges and road constructed as well as their complying technical documents Record of bridge post completion inspection	MOC continues to revise and update the technical documents MOC support promotion and dissemination of the technical documents to construction engineers in Myanmar		
Project Purpose The capacity of MOC engineers on construction management for bridge and road construction enhanced	(Upon completion of the Project,) 1. The technical documents are distributed and ready to be used to all MOC offices. 2. The technical documents are used and applied by the state and regional offices of MOC where the pilot projects have been carried out. 3. The maintenance records of bridges constructed through the pilot projects are submitted to the MOC headquarters for monitoring.	1-1 Observation by C/P and the experts 1-2 Record of project supervision 1-3 Interview to engineers participated in the workshops/seminars 2-1 Observation by C/P and the experts 2-2 Record of project supervision 2-3 Interview to engineers participated in the workshops/ seminars 3-1 maintenance record 3-2 Observation by C/P and experts	The current policy on quality assurance for construction remain unchanged. Quality assurance activities carried out continuously after the project completes		
Outputs Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided	1-1 The advises and the recommendations to MOC are practical and provided in a timely manner 1-2 MOC increases the knowledge on selected policies and technical documents on road and bridges.	1-1 Activity reports, reports submitted to MOC, interview to C/P 1-2 List of technical documents introduced, results of post-seminar evaluation	Sufficient and accurate testing services for quality control are available in a timely manner		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced	2-1 The draft of the work process on quality and safety control for concrete and bridge construction completed, submitted and reviewed 2-2 Trainings on work process for quality and safety control of concrete and bridge construction are carried out	2-1 Draft of the work process, interviews to MOC, samples of the bridge inventory 2-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Sufficient budget for activities to ensure quality and safety control is allocated Organizational arrangement for implementation remains no significant changes		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed	3-1 The draft technical documents are completed, submitted and reviewed 3-2 Trainings on construction management for quality and safety control of concrete and bridge construction are carried out	3-1 Draft of the technical documents interview to MOC 3-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Training carried out regularly and continuously by the Myanmar side		

Activities	Inputs		Pre-Conditions
	The Japanese Side	The Myanmar Side	
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc. 1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected. 1-3 Propose prospective Japanese technical assistance for the road and bridge sectors. 1-4 Introduce Japanese technical documents through seminars. 2-1 Investigate the current condition of the overall capacity and the work process in MOC. 2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings. 2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project. 2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance. 2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes. 2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects. 2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars. 2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC. 3-1 Investigate the current condition of the existing technical documents of MOC. 3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings. 3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction). 3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s). 3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars. 3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	1. Experts (1) Long-term Experts Road / Bridge Policy Advisor Construction Management / Monitoring and Evaluation / Coordinator (2) Short-term Experts Quality control (Concrete) Quality control (Steel bridge) Quality control (PC bridge) Quality control (Foundation) Safety control Bridge Inventory / Work Process Design Examination (Steel Bridge) PPP Road Policy River Planning, River Structure and Bridge Planning. (3) Lecturers of the Seminars 2. Training in Japan 3 times (1 time / year)	1. Counterpart (1) Project Director General (2) Project Director (3) Project Manager (4) Counterpart Team Department of Bridges, MOC Department of Highways, MOC 2. Equipment and Facilities (1) Office space in the building of MOC's HQ for the Road/Bridge Policy Advisor with office furniture and utilities such as internet connection, electricity, air conditioner etc. (2) Office space in the building of MOC's HQ for other Project members with office furniture and utilities such as internet connection, electricity, air conditioner etc. 3. Local Cost Borne by the Myanmar Side (1) Trainees' and Participants' expenses of workshops/ seminars, trainings in Myanmar including travel expenses, allowance etc. (2) Construction cost of the Pilot Project(s) 4. TAG (1) Expenses of Myanmar side of TAG which is regularly held to invite relevant organizations, such as BRL, RRL, YCDC, YTU etc.	Sufficient number of counterparts with appropriate expertise are assigned to the Project

Plan of Operation

FORM 3-3 PO

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

Inputs	Expert in Charge
Expert	
Road / Bridge Policy Advisor	MITSUISHI Akira
Construction Management / Monitoring and Evaluation / Coordinator	SENOO Kei
Team Leader / Quality Control (Concrete-1)	OKAZAKI Akio
Deputy Team Leader / Quality Control (Concrete-2)	WATANABE Ryohei
Quality Control (Concrete Bridge)	MUKOYAMA Tatsuo
Quality Control (Steel Bridge)	YASUDA Masahiko
Quality Control (Foundation)	OCHIAI Eiji
Safety control	TONEGAWA Yasunori / KUGE Takahiro
Construction Management	ASAKURA Hajime
Bridge Inventory (1)	KUNIKATA Keigo / Mr. Kyaw Moe Aung
Bridge Inventory (2)	TSUCHIDA Takayuki
Design Examination (Steel Bridge)	TAKAGI Nobuhiko
PPP Road Policy	MINATO Takayuki
Experts for River Engineering Seminar	Dr.J. Santos, Mr.Takata and Mr.Nagata
Coordinator / Training Planning	NAKAYAMA Makiko
Training in Japan	

Year: JFY2016 (I II III IV) | JFY2017 (I II III IV) | JFY2018 (I II III IV) | JFY2019 (I II III IV)

Month: 4 5 6 7 8 9 10 11 12 1 2 3

Plan / Actual

Remarks | Monitoring: Issue | Solution

Activities	Responsible Organization: Japan	GOM	Achievements	Issue & Countermeasures
Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided				
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc.	JICA	MOC		
1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected.	JICA	MOC		
1-3 Propose prospective Japanese technical assistance for the road and bridge sectors.	JICA	MOC		
1-4 Introduce Japanese technical documents through seminars.	JICA	MOC		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced				
2-1 Investigate the current condition of the overall capacity and the work process in MOC.	JICA	MOC		
2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.	JICA	MOC		
2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.	JICA	MOC		
2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance.	JICA	MOC		
2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes.	JICA	MOC		
2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.	JICA	MOC		
2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars.	JICA	MOC		
2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	JICA	MOC		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed				
3-1 Investigate the current condition of the existing technical documents of MOC.	JICA	MOC		
3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.	JICA	MOC		
3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction).	JICA	MOC		
3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).	JICA	MOC		
3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars.	JICA	MOC		
3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	JICA	MOC		
Duration / Phasing				

Year: 1st Year (I II III IV) | 2nd Year (I II III IV) | 3rd Year (I II III IV) | 4th Year (I II III IV)

Plan / Actual

Monitoring Plan	Remarks	Issue	Solution
Monitoring			
Joint Coordination Committee			
Set-up the Detailed Plan of Operations			
Submission of Monitoring Sheet			
Reports/Documents			
Project Completion Report			

TO CR of JICA　MYANMAR OFFICE

PROJECT MONITORING SHEET

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of Myanmar

Version of the Sheet: Ver.6 (April 2019) (revised with red letters)

Name: Kei SENOO / Akio OKAZAKI
Title: JICA Long-term Expert / Team Leader
Submission Date: 9 April 2019

I. Summary

1. Progress

1-1 Progress of Inputs

[Japan side]

- Long-term Experts: 2 persons (from November 2016)
- Short-term Experts: 74.70MM (Whole Project: 74.70 MM)

[Myanmar side]

- 2 Project offices

1-2 Progress of Activities

[Output 1: Advises to a broad policy matters and technical documents on road and bridge sectors provided]

(Activity 1-1: 【Finished】Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc.)

- Japanese policies and technologies are introduced at 4th and 5th Myanmar-Japan Vice-Ministerial Level Meeting in March 2017 and March 2018
- The seminar on environmental impact assessment with Cambodia JICA team was held in October 2017.
- Seminar on PPP for road development was held in February 2018
- Cambodia study tour on road and bridge policy matters was held in March 2018.
- Japanese road development scheme was introduced at “PPP Workshop for Myanmar Toll Roads” in June 2018.

(Activity 1-2: 【Finished】Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected.)

- Lectures about road and bridge maintenance method at Thuwunna Training Centre were given by JICA Experts in July 2017, May 2018, and November 2018.
- Technical advices were given for Myaungmya Bridge accident in April 2018
- Japanese suspension bridge inspection team was organized and joined by JICA Experts in May and June 2018.
- Documents and advices were given regarding road/bridge policy and technology such as PPP, road design, logistics master plan, upgrading of Yangon-Mandalay Expressway, construction machinery, road/bridge numbering system, occupation of road space, silent piling technology, wind tunnel testing, bridge painting system, general information of Japan's road and bridge maintenance, developing of Yangon Elevated Expressway, dispute board, road safety improvement with ADB and other Japanese company, etc.
- Documents and advices were given in cooperation with other JICA projects such as Dawbon Bridge Project, Bago River Bridge Project, EWEC Phase I (Gyaing Kawkareik, Gyaing Zathapyin, and Atran Bridge) Project, EWEC Phase II (Sittang River Bridge) Project, Thilawa Access Road Project, Yangon Outer Ring Road, Road Construction and Maintenance Equipment Provision Project, Projects of partnerships with Private-Sector Activities, SATREPS Project, and EEHE Project.
- Advices were given regarding by holding seminars for stud bolt, construction machinery, bridge maintenance, pavement and PPP in March 2019.

(Activity1-3: 【Finished】Propose prospective Japanese technical assistance for the road and bridge sectors.)

- Capacity Development Project for Road and Bridge Maintenance was proposed in July 2018.
- Thuwunna Training Centre upgrading outline were introduced in YTU/MES/JSCE joint seminar in June 2018.

(Activity1-4: 【Finished】 Introduce Japanese technical documents through seminars.)

- Advanced PC Bridge technologies were introduced and regarding information was exchanged in JPCI joint seminar in March 2017, and October 2018.
- Advanced civil engineering technologies were introduced and regarding information was exchanged in YTU/MES/JSCE joint seminar in October 2017
- Bridge maintenance technology was introduced by Joint Seminar of MOC/Tokyo

Univ. in September 2018.

- Hydrological technology for planning and designing bridges was transferred in the hydrological seminar in November 2018.

[Output 2: The work process for quality and safety of concrete and bridge construction projects developed and enhanced]

(Activity 2-1: 【Finished】Investigate the current condition of the overall capacity and the work process in MOC)

- "The Baseline Survey Report" was submitted in October 2016, through several site visits and MOC staff interviews.

(Activity 2-2: 【Finished】Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.)

- Japanese guidelines of construction management were introduced in the lecture at Thuwunna Training Centre in July 2017.
- Construction Management based on FIDIC were introduced in the workshops in June, August, October 2017 and January 2019.

(Activity2-3: 【Finished】Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.)

- The workshops on construction management were held eight (8) times.
- The draft of the construction management guideline was submitted in November 2017
- Construction management guideline was revised by CTs throughout the pilot project and confirmed by DOH and DOB. The Guideline was finalized after incorporating the comments from DOB and DOH in November 2018.

(Activity 2-4: 【Finished】Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance)

- Bridge data for the system has been collecting from June 2017.
- System for the Bridge Inventory Database was developed in July 2017.
- Data server of the Bridge Inventory Database was installed at MPT Data Center in August 2017.

- Workshops on how to input the data into the system were held in August 2017.
- Data-input of bridge basic information is completed in February 2018
- Data-input of additional information such as drawings and completion report were completed in November 2018.
- Some minor modifications in the system have been requested by CTs for actual use for MOC in November 2018. These requests are discussed and incorporated to the current system during Stage-4 of the Project.
- Database system was completed after modifications requested by CTs and handed over to MOC in April 2019.

(Activity 2-5: 【Finished】Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects complete.

- The draft of the procedures was submitted in June 2018.
- Hand-over procedure work flow was introduced in construction management guideline submitted in November 2018.
- Practical operation of the Hand-over procedure work described in the Construction Management Guideline was approved and authorized in April 2019.

(Activity 2-6: 【Finished】Carry out on-the job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.

- On-the job training at pilot project site was held in January to October 2018.
- Total eleven (11) locations of pilot project site was arranged by MOC.

(Activity 2-7: 【Finished】Distribute the guideline and procedures to relevant organizations / officers / engineers through workshops/seminars

- Construction Management Guideline was distributed throughout the regional seminars to the relevant organization such as Reginal Government and Universities as well as Private Contractors.
- Regional Seminars were held at Magway, Myitkyina, Mawlamyaing, Nay Pyi Taw and Yangon respectively to deliver the knowledge of CTs to engineers more than 400.

(Activity 2-8: 【Finished】Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.

- Monitoring sheet was reported and officially approved by every JCC meeting.

- Draft of Project Completion Project was submitted to MOC on 25 March 2019.
- Monitoring sheet ver.6 was submitted 9th April 2019.

[Output 3: The technical documents on quality and safety control for concrete and bridge construction developed]

(Activity 3-1: 【Finished】Investigate the current condition of the existing technical documents of MOC)

- "The Baseline Survey Report" was submitted in October 2016, through many site visits and MOC staff interviews.
-

(Activity 3-2: 【Finished】Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.)

- Japanese technical documents were introduced through the Workshops for manual development
- Other ASEAN countries' technical documents were also introduced through meetings in MOC.

(Activity 3-3: 【Finished】Draft technical documents on construction supervision (quality and safety control for road and bridge construction))

- The workshops on "concrete structure" were held fifteen (15) times.
- The workshops on "PC structure" were held thirteen (13) times.
- The workshops on "steel structure" were held fifteen (15) times.
- The workshops on "bridge foundation" were held twenty three (23) times.
- The workshops on "safety management" were held seventeen (17) times.
- The workshops on "design examination for steel bridge" were held twenty one (21) times.
- The draft of Quality and Safety Control Manual was submitted in November 2017
- Quality and Safety Control Manual were revised by CTs throughout the pilot project and confirmed by DOB and DOH. The manuals were finalized after incorporating the comments from DOB and DOC in November 2018.

(Activity 3-4: 【Finished】Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).

- On-the job training of "concrete structure" at pilot project site was held in February, March, and October 2018.

- On-the job training of “PC structure” at pilot project site was held from January to March 2018.
- On-the job training of “steel structure” at pilot project site was held in March and April 2018.
- On-the job training of “bridge foundation” at pilot project site was held from January to March 2018.
- On-the job training of “safety management” at pilot project site was held from February to April 2018.

(Activity 3-5: 【Finished】Distribute the technical documents to the relevant organizations / officers / engineers through workshops / seminars.

- Quality and Safety Control Manuals were distributed throughout the regional seminars to the relevant organization such as Reginal Government and Universities as well as Private Contractors.
- Regional Seminars were held at Magway, Myitkyina, Mawlamyaing, Nay Pyi Taw and Yangon respectively to deliver the knowledge of CTs to engineers more than 400.

(Activity 3-6: 【Finished】Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.

- Monitoring sheet was reported and officially approved by every JCC meeting.
- Quality and Safety Control Manual was approved and authorized by the 6th JCC meeting.

1-3 Achievement of Output

[Output 1: Advises to a broad policy matters and technical documents on road and bridge sectors provided]

(Verifiable Indicator 1-1: 【Achieved】The advises and the recommendations to MOC are practical and provided in a timely manner**)**

- The advices have been given timely regarding road/bridge policy and technology according to MOC request.

(Verifiable Indicator 1-2: 【Achieved】MOC increases the knowledge on selected policies and technical documents on road and bridges.)

- Policies and technical Documents have been given through seminars and

workshops.

[Output 2: The work process for quality and safety of concrete and bridge construction projects developed and enhanced]

(Verifiable Indicator 2-1: **【Achieved】**the draft of the work process on quality and safety control for concrete and bridge construction are completed, submitted and reviewed

- Confirmation of construction management guideline itself
- Confirmation by means of interviews to MOC
- Confirmation by samples of the bridge inventory
- Construction Management Guideline were officially submitted on 29 March 2019 after correction requested through reginal seminars.
- Bridge Inventory Database System with 945 bridges of sample data was completed handed over in April 2019.

(Verifiable Indicator 2-2: **【Achieved】**Trainings on work process for quality and safety control of concrete and bridge construction are carried out

- Workshops and OJTs were implemented for Construction management.
- CTs were trained through Regional Seminars by playing a role of a Trainer.
- Final Examination was implemented and capacity of all five (5) CTs for Construction Management and three (3) CTs for Database were certified with sufficient level of understanding.

[Output 3: The technical documents on quality and safety control for concrete and bridge construction developed]

(Verifiable Indicator 3-1: **【Achieved】**The draft technical documents are completed, submitted and reviewed

- Confirmation quality and safety control manual itself
- Confirmation by means of interviews to MOC
- Quality Control Manual for Concreter Structure, PC Girder, Steel Bridge, Bridge Foundation and Safety Control were officially submitted on 29 March 2019 after correction requested through reginal seminars.

(Verifiable Indicator 3-2: 【Achieved】Trainings on construction management for quality and safety control of concrete and bridge construction are carried out

- Workshops and OJTs were implemented for Concrete Structure, PC-Girder, Steel Bridge, Bridge Foundation and Construction Safety.
- CTs were trained through Regional Seminars by playing a role of a Trainer.
- Final Examination was implemented and twenty-four (24) CTs for Concrete Structure, PC Girder, Steel Bridge, Bridge Foundation and Safety Control were certified with sufficient level of understanding.

1-4 Achievement of the Project Purpose

Project Purpose: "The capacity of MOC engineers on construction management for bridge and road construction is enhanced." were **achieved** in terms of following viewpoints in accordance with "Objectively Verifiable Indicator".

【Indicators】

(1) The technical documents are distributed and ready to be used to all MOC offices.

[1-1 Observation by C/P and the experts]

The contents of the technical documents have been finalized, and the provisional edition has been distributed at regional seminars. The practical application of the Manuals will be officially kicked-off after the final JCC meeting scheduled. Draft of technical documents were delivered to all related office for their review. It is expected that the manual shall be delivered to each office by means of hard copy and/or PDF file after the authorization.

[1-2 Record of project supervision]

It was confirmed that activities on development of technical documents were described in Project Monitoring Sheet (ver.2~Ver.5).

[1-3 Interview to engineers participated in the workshops/seminars]

According to the interview and questionnaires to CTs and JCC members, provisional version of the technical documents have been already distributed to regional offices and construction units.

(2) The technical documents are used and applied by the state and regional offices of MOC where the pilot projects have been carried out.

[2-1 Observation by C/P and the experts]

The technical documents have been used and applied to 11 construction site for pilot projects.

[2-2 Record of Project Supervision]

It was confirmed that activities on development of technical documents were

described in Project Monitoring Sheet (ver.2~Ver.5).

[2-3 Interview to engineers participated in the workshops/ seminars]

According to interview to CTs, the Manuals have been already used by some construction units for actual works. In addition, MOC has also been started to utilize the Manuals for their internal promotion examinations in DOB since February 2019.

(3) The maintenance records of bridges constructed through the pilot projects are submitted to the MOC headquarters for monitoring.

[3-1 Maintenance Record (Records to be used for Maintenance)]

The pilot projects were carried out based on technical documents (quality/safety control manuals) and its results were recorded by using formatted inspection sheet/check list attached to the technical documents under the instruction of JICA Experts. These record will be utilized for future maintenance.

[3-2 Observation by C/P and experts]

The system/procedure for data recording and document controlling has been introduced in the construction guideline to be utilized for maintenance in the future. The data on quality control as well as construction documents such as shop drawings are supposed to be recorded in Database System at Maintenance Section in MOC Head Office in accordance with handing over procedure introduced in the Construction Guideline for future maintenance.

1-5 Changes of Risks and Actions for Mitigation

- N/A

1-6 Progress of Actions undertaken by JICA

- JICA Experts reported progress of the Project and proposed countermeasures against issues on the Project at the JCC Meetings.
- Trainings in Japan were conducted for three (3) times. Effective plans and schedules for the training were organized by JICA Experts.
- Workshops and seminars for quality and safety control, PPP as well as construction management were taken place.
- On-the job trainings and site investigations for improving project results were conducted.
- Other ASEAN Manuals and guidelines were provided as reference for MOC to compare the contents of manuals and guideline developed under this Project.
- JICA Experts plan to give some proposals to make the transferred technology

more effective by reflecting Myanmar construction situation including MOC reorganization.

1-7 Progress of Actions undertaken by MOC

- JCC meetings were organized four (5) times. MOC organized and chaired the meetings and showed issues on the Project.
- The Core Trainers (CTs) have already shared knowledge and technology from the project at the lectures at Thuwanna Training Centre for young MOC engineers.
- CTs participated in trainings in Japan and reported their activities to share their findings at the trainings not only at JCC Meeting but also small discussion to MOC engineers. CTs really regarded Myanmar's issues and deeply discussed the countermeasure to be taken by MOC based on information got in Japan.
- CTs and MOC officers actively participated in the workshops, seminars, on-the job trainings and site investigations.
- MOC selected the CTs appropriate to the Project.
- CTs voluntary shared information and knowledge learned from the Project with newly participated CTs for their smooth understanding.
- MOC selected the site of Pilot Project and arranged budget for them in December 2017.
- CTs introduced the achievements of the Pilot Project to MOC in June 2018.
- MOC extended the draft manuals to Construction Units to collect their comments. CTs gave lectures and exchanged opinion how to apply the manuals with MOC engineers and revised them.
- MOC checked the guideline and manual submitted by JICA Project Team.

1-8 Progress of Environmental and Social Considerations (if applicable)

- N/A

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

- N/A

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

- N/A

2. Delay of Work Schedule and/or Problems (if any)

2-1 Detail

- 2nd Japan training was delayed from Nov 2017 to May 2018.
- Some Core Trainers could not attend some workshops.
- Some delay of data input in the bridge inventory data base system

➢ **Cause**

- Request from MOC.
- Core Trainers' personnel transfers.
- Some of existing bridge data such as drawings and reports were missed.

➢ **Action to be taken**

- JICA HQ is arranging the schedule.
- JICA has requested MOC for special consideration for CTs to attend the left workshops and additional workshops was held for them to catch up.
- CTs of data base continue hard to input data with JICA project team support, and data input is to be completed by the end of December 2018.

➢ **Roles of Responsible Persons/Organization (JICA, Gov. of Myanmar, etc.)**

- JICA HQ
- Directors General of DOH and DOB and JICA project team
- Directors General of DOB and JICA project team

3. Modification of the Project Implementation Plan

3-1 PO

- N/A

3-2 Other modifications on detailed implementation plan

- Assignment for technical transfer on design examination for steel bridge was added to the project. (3.0 MM)
- Assignment for a road PPP expert was added to the project. (0.4 MM)
- Assignment for hydrological experts was added to the project. (0.81 MM)

4. Preparation of Gov. of Myanmar toward after completion of the Project

To achieve the Overall Goal, following action need to be taken by MOC after completion of the Project.

(1) Continuous Capacity Development of Construction Engineer for Quality/Safety Control

- To provide periodic training to the MOC engineers for Quality/Safety Control at CTC based on the technical documents (Manuals). (Once a Year)
- To conduct periodic training to private or other engineers for Quality/Safety Control through engineering organization and universities. (Once a Year)

(2) Improvement of Systems on Construction Management Appropriate budget for the Quality/Safety control shall be ensured.

- To stipulate the liability to utilize the Manuals in Contract Document/Work order for each construction.
- To oblige to prepare and to submit Quality/Safety Control Plan for every bridge construction/concrete structure based on the Manuals.
- To store the Construction Records in Database System for future maintenance.

(3) Proper management of the Technical Documents.

- To appoint the section to keep and publish the technical documents (Manuals) in MOC to deliver these technical documents (Manuals) nationwide.

(4) Materialization of Role and Responsibility in the Quality/Safety Control •

- To develop Standard Operation Procedure/Scope of authority and responsibility for each section and position related to Quality/Safety Control as MOC regulation.

(5) Strengthen the Enforcement

- To stipulate the role and responsibility of each organization/personnel for Quality/Safety Control in the Work Order to Construction Units, as well as the Contract with private contractor.

(6) Development of Feed-back system

- To report the defects or error in quality control during the construction shall be established in MOC for further improvement of the quality.

II. Monitoring Sheet Form 3-2 and Form 3-3 *as Attached*

Project Design Matrix

Project Title: The Project for Capacity Development of Road and Bridge Technology

Version 4.0
Dated November 29, 2018

Implementing Agency: MOC
Target Group: Department of Bridges, Department of Highways
Period of Project: 3.5 years (including 0.5 year for preparation)
Project Site: Nay Pyi Taw and whole country of Myanmar
Model Site:

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Quality of bridges and concrete structures constructed or managed by MOC improved	（Within 5 years after the project completes, ） 1. All bridges and concrete structures consrtucted after the end of this Project complying the technical documents. 2. The strength, and appearance of the concrete structure built by MOC is maintained within the requirements stipulated in the technical documents.	List and record of bridges and road constructed as well as their complying technical documents Record of bridge post completion inspection	MOC continues to revise and update the technical documents MOC support promotion and dissemination of the technical documents to construction engineers in Myanmar		
Project Purpose The capacity of MOC engineers on construction management for bridge and road construction enhanced	（Upon completion of the Project,） 1. The technical documents are distributed and ready to be used to all MOC offices. 2. The technical documents are used and applied by the state and regional offices of MOC where the pilot projects have been carried out. 3. The maintenance records of bridges constructed through the pilot projects are submitted to the MOC headquarters for monitoring.	1-1 Observation by C/P and the experts 1-2 Record of project supervision 1-3 Interview to engineers participated in the workshops/seminars 2-1 Observation by C/P and the experts 2-2 Record of project supervision 2-3 Interview to engineers participated in the workshops/ seminars 3-1 maintenance record 3-2 Observation by C/P and experts	The current policy on quality assurance for construction remain unchanged. Quality assurance activities carried out continuously after the project completes		
Outputs Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided	1-1 The advises and the recommendations to MOC are practical and provided in a timely manner 1-2 MOC increases the knowledge on selected policies and technical documents on road and bridges.	1-1 Activity reports, reports submitted to MOC, interview to C/P 1-2 List of technical documents introduced, results of post-seminar evaluation	Sufficient and accurate testing services for quality control are available in a timely manner		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced	2-1 The draft of the work process on quality and safety control for concrete and bridge construction completed, submitted and reviewed 2-2 Trainings on work process for quality and safety control of concrete and bridge construction are carried out	2-1 Draft of the work process, interviews to MOC, samples of the bridge inventory 2-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Sufficient budget for activities to ensure quality and safety control is allocated Organizational arrangement for implementation remains no significant changes		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed	3-1 The draft technical documents are completed, submitted and reviewed 3-2 Trainings on construction management for quality and safety control of concrete and bridge construction are carried out	3-1 Draft of the technical documents interview to MOC 3-2 List of participants, result of final examination/ observation of his/her work on-site and attendance record, etc.	Training carried out regularly and continuously by the Myanmar side		

Activities	Inputs		Pre-Conditions
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc. 1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected. 1-3 Propose prospective Japanese technical assistance for the road and bridge sectors. 1-4 Introduce Japanese technical documents through seminars.	The Japanese Side 1. Experts (1) Long-term Experts Road / Bridge Policy Advisor Construction Management / Monitoring and Evaluation / Coordinator (2) Short-term Experts Quality control (Concrete) Quality control (Steel bridge) Quality control (PC bridge) Quality control (Foundation) Safety control Bridge Inventory / Work Process Design Examination (Steel Bridge) PPP Road Policy River Planning, River Structure and Bridge Planning. (3) Lecturers of the Seminars 2. Training in Japan 3 times (1 time / year)	The Myanmar Side 1. Counterpart (1) Project Director General (2) Project Director (3) Project Manager (4) Counterpart Team Department of Bridges, MOC Department of Highways, MOC 2. Equipment and Facilities (1) Office space in the building of MOC's HQ for the Road/Bridge Policy Advisor with office furniture and utilities such as internet connection, electricity, air conditioner etc. (2) Office space in the building of MOC's HQ for other Project members with office furniture and utilities such as internet connection, electricity, air conditioner etc. 3. Local Cost Borne by the Myanmar Side (1) Trainees' and Participants' expenses of workshops/ seminars, trainings in Myanmar including travel expenses, allowance etc. (2) Construction cost of the Pilot Project(s) 4. TAG (1) Expenses of Myanmar side of TAG which is regularly held to invite relevant organizations, such as BRL, RRL, YCDC, YTU etc.	Sufficient number of counterparts with appropriate expertise are assigned to the Project
2-1 Investigate the current condition of the overall capacity and the work process in MOC. 2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings. 2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project. 2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance. 2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes. 2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects. 2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars. 2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.			
3-1 Investigate the current condition of the existing technical documents of MOC. 3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings. 3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction). 3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s). 3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars. 3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.			

Record of Operation

FORM 3-3 PO

Project Title: The Project for Capacity Development of Road and Bridge Technology in the Republic of the Union of Myanmar

Inputs	Expert in Charge
Expert	
Road / Bridge Policy Advisor	MITSUISHI Akira
Construction Management / Monitoring and Evaluation / Coordinator	SENOO Kei
Team Leader / Quality Control (Concrete-1)	OKAZAKI Akio
Deputy Team Leader / Quality Control (Concrete-2)	WATANABE Ryohei
Quality Control (Concrete Bridge)	MUKOYAMA Tatsuo
Quality Control (Steel Bridge)	YASUDA Masahiko
Quality Control (Foundation)	OCHIAI Eiji
Safety control	TONEGAWA Yasunori / KUGE Takahiro
Construction Management	ASAKURA Hajime
Bridge Inventory (1)	KUNIKATA Keigo / Mr. Kyaw Moe Aung
Bridge Inventory (2)	TSUCHIDA Takayuki
Design Examination (Steel Bridge)	TAKAGI Nobuhiko
PPP Road Policy	MINATO Takayuki
Experts for River Engineering Seminar	Dr.J. Santos, Mr.Takata and Mr.Nagata
Coordinator / Training Planning	NAKAYAMA Makiko
Training in Japan	

Year: JFY2016 (I II III IV) | JFY2017 (I II III IV) | JFY2018 (I II III IV) | JFY2019 (I II III IV)

Month: 4 5 6 7 8 9 10 11 12 1 2 3

Plan / Actual

Remarks | Monitoring: Issue | Solution

Activities	Responsible Organization: Japan	GOM	Achievements	Issue & Countermeasures
Output 1. Advises to a broad policy matters and technical documents on road and bridge sectors provided				
1-1 Provide various information on technologies and policy related to the road and bridge sectors in Japan or other countries through workshops/seminars, trainings etc.	JICA	MOC		
1-2 Provide necessary advise on a various issues related to the road and bridge sectors when consulted based on the information collected.	JICA	MOC		
1-3 Propose prospective Japanese technical assistance for the road and bridge sectors.	JICA	MOC		
1-4 Introduce Japanese technical documents through seminars.	JICA	MOC		
Output 2. The work process for quality and safety of concrete and bridge construction projects developed and enhanced				
2-1 Investigate the current condition of the overall capacity and the work process in MOC.	JICA	MOC		
2-2 Introduce the outlines of construction management and the work process in Japan or other countries through workshops/seminars and trainings.	JICA	MOC		
2-3 Draft the guideline on construction management methods and the work process to apply the technical documents developed by the Project.	JICA	MOC		
2-4 Develop the bridge inventory (system framework and sample database) to keep documents and data necessary for maintenance.	JICA	MOC		
2-5 Draft the procedures to hand-over the as-built drawings, etc. from the construction dept. to the maintenance dept. when projects completes.	JICA	MOC		
2-6 Carry out on-the-job training on the construction management and the work process applying the contents of the procedures utilizing the selected pilot projects.	JICA	MOC		
2-7 Distribute the guideline and procedures to relevant organizations / offices / engineers through workshops / seminars.	JICA	MOC		
2-8 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	JICA	MOC		
Output 3. The technical documents on quality and safety control for concrete and bridge construction developed				
3-1 Investigate the current condition of the existing technical documents of MOC.	JICA	MOC		
3-2 Introduce the outlines of construction supervision, the technical documents and the technologies used in Japan and other countries through workshops/ seminars and trainings.	JICA	MOC		
3-3 Draft technical documents on construction supervision (quality and safety control for road and bridge construction).	JICA	MOC		
3-4 Carry out on-the-job training on construction supervision utilizing the selected pilot project(s).	JICA	MOC		
3-5 Distribute the technical documents to the relevant organizations / offices / engineers through workshops/ seminars.	JICA	MOC		
3-6 Monitor the progress of the above activities and attainment & application of the technical contents periodically and report the results to JCC.	JICA	MOC		
Duration / Phasing				

Year: 1st Year (I II III IV) | 2nd Year (I II III IV) | 3rd Year (I II III IV) | 4th Year (I II III IV)

Remarks | Issue | Solution

Monitoring Plan
Monitoring
Joint Coordination Committee (Plan ▲ / Actual △)
Set-up the Detailed Plan of Operations (Plan ▲ / Actual △)
Submission of Monitoring Sheet (Plan ▲ / Actual △)
Reports/Documents
Project Completion Report (Plan ▲ / Actual △)