

Brief Report of the Project Formulation Survey Team

for

**the “Ayeyarwady-Delta Region, Human Resources
Development Project of the Labour-intensive-type Road
Improvement Works (Road Surface Treatment)
in order to increase the job opportunities”**

November, 2010

Japan Infrastructure Partners (JIP)

0. Data

0-1. Abbreviations

JICA: Japan International Cooperation Agency
JIP: Japan Infrastructure Partners
PES: Myanmar Engineering Society
PW: Public Works, Ministry of Construction, Myanmar
RCSU: Road Construction Special Unit, PW

0-2. Team Members

Akira KOMURO, President, JIP
Koji KAMIAGA, JIP

0-3. Schedule

October 2010

Sat, 2 11:00/15:30 Tokyo/Bangkok
17:50/18:45 Bangkok/Yangon

Sun, 3 visited the memorial to the victims of Myanmar and Japanese bridge engineers due to the 1978 aircraft accident,
visited Road Research Laboratory in Yangon,
inspected the Thuwanna bridge.

Mon, 4 paid a courtesy call on; Japanese embassy and JICA office,
held a discussion with MES and Road Research Laboratory of PW on the Project.

Tue, 5 held a discussion with MES and Road Research Laboratory of PW on the Project.

Wed, 6 & Thu 7: inspected the Project site in Ayeyawardy region.

Fri, 8: held a discussion with MES and Road Research Laboratory of PW on the Project,
visited Japanese embassy and JICA office

Sat, 9: 9:50/11:45 Yangon/Bangkok

0-4. People met by the Team

i) MES

U Han Zaw President, Myanmar Engineering Society

ii) Road Research Laboratory of PW

U Aung Myint, Consultant of Road Research Laboratories
U Soe Tint Deputy Chief Engineer
Daw Hla Hla Thwe Deputy Superintending Engineer

U Soe Tun Naing,	Executive Engineer
Daw Htar Zin Thin Zaw	Assistant Engineer
Daw Zin Zin Htike	Assistant Engineer
Daw Hnin Yu Aung	Junior Engineer (4)
U Tin Htut	Laboratory Engineer
U Zaw Win	Assistant Engineer

iii) Japanese Embassy

Mitsuji SUZUKA	Counselor
Hiroshi NOMURA	Second Secretary

iv) JICA Myanmar Office

Hideo MIYAMOTO	Chief Representative
Katsuyoshi SAITO	Senior Representative
Hajime MATSUMOTO	Representative

v) JFE Engineering Corporation Yangon Office

Masayuki Seike	General Manager
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1. Photos of Meetings



Photo-1: The Team paid a floral tribute to the memorial of Myanmar and Japanese bridge engineers. U Han Zaw kindly attended it.



Photo-2: The Team visited Japanese embassy in Yangon.



Photo-3: The Team held discussion at JICA office.



Photo-4: The Team was listening to the presentation of PW.



Photo-5: Discussion with PW as well as U Han Zaw.



Photo-6: Discussion at Road Research Laboratory.

2. Background

Ayeyawardy-Delta region is badly lagging behind in the development of its basic infrastructure including its road network in particular, and consequently the agricultural industry there still remains in the subsistence farming level due to the lack of accessibility to the markets of urban areas. Without cash income, poor people in the region are facing more difficulties in education, healthcare and access to water supply and electricity. To make the situation worse, Cyclone Nargis hit the region in 2008, resulting in 140,000-death or missing, 2.4 million sufferers, and catastrophic damage of its infrastructure. It is now, therefore, essential for this region to provide people with more job opportunities, in addition to a more stable road network.

Taking the situation into account, Myanmar government decided to start in 2008 the urgent road improvement project in this region, comprising an 840 km length of eleven roads.

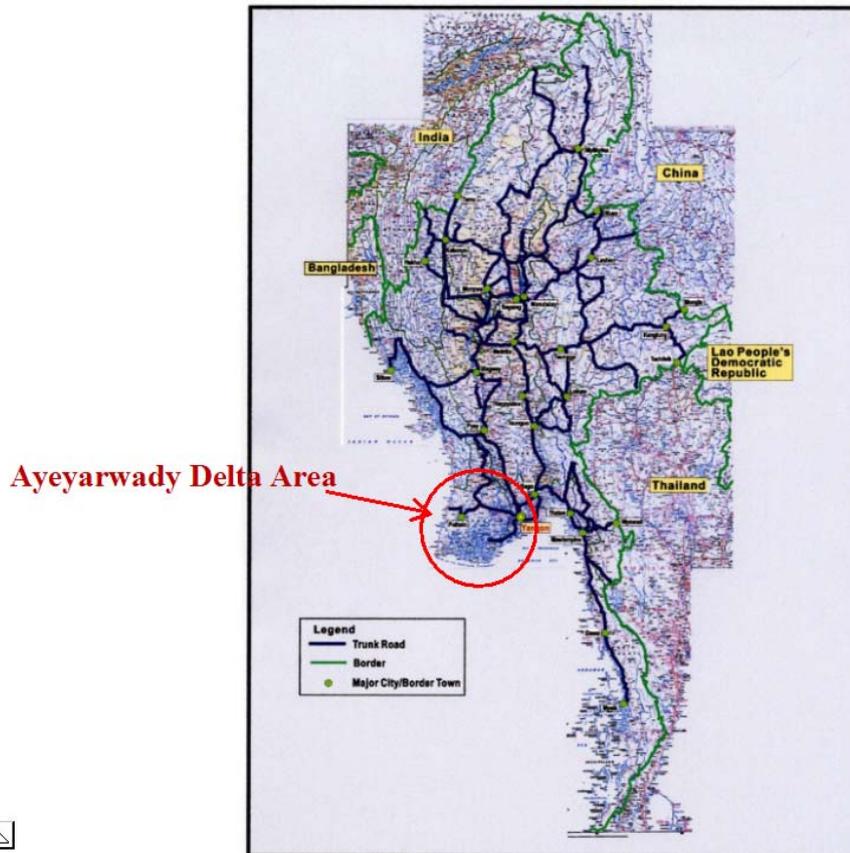
However, such rush construction works are not being implemented out properly in the absence of an engineering manual focusing on "labour-intensive-type road improvement works in order to increase job opportunities". This grass-root Project intends to support Myanmar engineers to establish labour-intensive-type road pavement method, provide people with job opportunities, and consequently reduce poverty in the region.



Photo-7 & 8: People of Mawlamyinegyn pointed out the flooding level during the attack of Cyclone Nargis.



Photo-9: Village of refugees of Nargis.

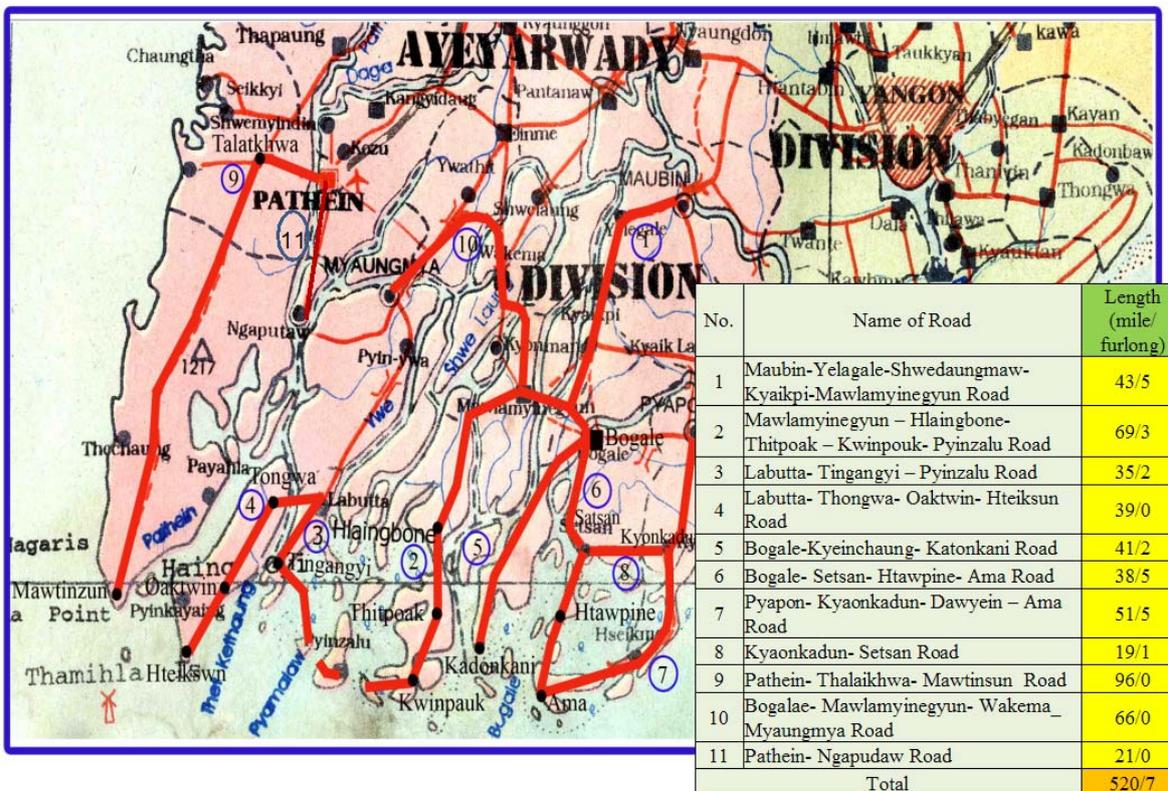


**Development of Road Network in Ayeyarwady Delta Area
(Upgrading & New Construction of the Roads)**

No.	Name of Road	Length (mile/ furlong)	Construction Group	Percentage of finishing work
1	Maubin-Yelagale-Shwedaungmaw-Kyaikpi-Mawlamyinegyun Road	43/5 (70.207 km)	RCSU(4)	100
2	Mawlamyinegyun - Hlaingbone- Thitpoak - Kwinpouk- Pyinzalu Road	69/3 (111.648km)	Mawlamyinegyun – Hlaingbone group +RCSU(4)	100
3	Labutta- Tingangyi – Pyinzalu Road	35/2 (56.729 km)	RCSU(15)	100
4	Labutta- Thongwa- Oaktwin- Hteiksun Road	39/0 (62.764 km)	RCSU (2+15)	100
5	Bogale-Kyeinchaung- Katonkani Road	41/2 (66.385 km)	RCSU(16)	100
6	Bogale- Setsan- Htawpine- Ama Road	38/5 (62.161 km)	RCSU(15+16)+ Maubin District	100
7	Pyapon- Kyaonkadun- Dawnyeina – Ama Road	51/5 (83.082 km)	Pyapon District	100
8	Kyaonkadun- Setsan Road	19/1 (30.779 km)	Pyapon District	100
9	Pathein- Talatkwa- Mawtinsun Road	96/0 (59.652 km)	Pathein District + Companies	100
10	Bogalae- Mawlamyinegyun- Wakema- Myaungmya Road	66/0 (41.011 km)	Companies	100
11	Pathein- Ngapudaw Road	21/0 (13.049 km)	Pathein District	22

Road Construction Special Unit = RCSU

Road Network Development Map of Ayeyarwady Delta Area



3. Inspection of the Project site

3-1. No.1 Maubin-Yelagale-Shwedaungmaw-Kyaikpi-

Mawlamyinegyun Road(70.2km)



Photo-10: Metalled road near Maubin along Road No.1.



Photo-11: Surface of Metalled road is not very smooth, consequently vehicles can run only at speed of around 20km/h or so.



Photo-12: Not only light vehicles but heavy vehicles also use these unpaved roads.



Photo-13: Unpaved roads cannot bear the load of a heavy vehicle, as a result the road surface is easily damaged in a short term of time.



Photo-14: Road Construction Special Unit (RCSU) was maintaining road surfaces.



Photo-15: Aggregates available there seemed not to be hard enough.

Photo-16: The Team considered that a certain technical advice was needed for maintenance works to improve durability of road surface.



Photo-17: The site engineers of RCSU (4) and the Team members.



Photo-18: Aggregates for the Matelled surfaces were hauled from a quarry of 80km away of the site.



Photo-19: Some sections were paved with bituminous treatment.



Photo-20: Road No. 5 branches off from Road No.1 near Bogale. Its embankment was completed but not yet paved due to the problem of soft soil.



Photo-21: The left photo shows the surface of embankment of Road No.2, which branches off from Road No.1 at Mawlamyinegyun. This section is one of the most problematic sections, where severe settlement occurred. At this point, a settlement of 2 feet during one year was observed. But the embankment of Road No.1, which is locate at the same place, is quite stable without any settlement. Therefore, the cause of the settlement does not seem to be the strength of ground, but the quality of soil material for embankment itself. In fact, the material of embankment appears to be “mud” rather than “soil”.



Photo-22: The site office of RCSU(4) near Kyaikpi along Road No.1.



Photo-23: The section near the RCSU(4) site office was in relatively stable condition. PW and the Team tentatively agree that pilot works under the Project will be conducted in this section.

3-2. Road from Pyapon to Bogale



Photo-24: Surface treatment works for road widening.



Photo-25: Aggregates were being spread manually. But the Team considered that the strength of “embankment” or “subgrade” should be checked.



Photo-26: Perhaps the quality of materials for embankment does not meet the standards.



Photo-27: Tires of a lorry were buried into the newly constructed portion of the embankment.



4. Outline of the Project

The Team carried out close consultation with MES and the Road Research Laboratory of PW on the proposed Project, and agreed the outline of the Project as indicated following attachment papers.

Attachment -1 : Outline of the Project

Attachment -2: Schedule (Tentative)

Attachment -3: Role Sharing of Activities

Attachment-1 : Outline of the Project

I. Outline of the Proposed Project	
1. Country	Myanmar
2. Title of the Project	Ayeyarwady-Delta Region, the Human Resources Development Project of the Labour-Intensive-type Lightly-Trafficed Road Surface Treatment Works, in order to increase the job opportunities for local people.
3. Background and Necessity of the Project	<p>In Myanmar, overcoming the airplane accidents in 1978, by which 6 members of JICA team and 2 members of Public Works were killed, the Bridge Engineering Training Center Project (BETC) was conducted successfully from 1980 to 85. Based on the results Of this technical corporation, many bridges have been constructed in Myanmar by the engineers of Public Works.</p> <p>However, the roads are still in poor conditions and they need improvement all over the country. In particular, the roads were seriously damaged in the Ayeyarwady-Delta Region, by Nargis Cyclone, and also by the heavy vehicles carrying the emergency aid supplies.</p> <p>On the other hand, people living there still continue to be poor, due to the difficulty in finding jobs.</p> <p>It is really needed to improve and maintain the road surfaces of the area properly for the social & economic development as well as the increase of the job opportunities.</p>
4. Project Purpose	<p>This Project aims at:</p> <ul style="list-style-type: none"> i) increase of job opportunities in local areas, human resources developemnt and ii) improvement of road transport network for sustainable development in the Ayeyarwady-Delta Region, <p>through</p> <ul style="list-style-type: none"> i) establishment and promotion of the method of labour-intensive-type road surface treatment works and countermeasures against the road surface settlement, ii) development of human resources in local communities, and iii) technical assistance to the engineers of Public Works.
5. Target Area	The Roads in the Ayeyarwady-Delta Region (Trial Worksite will be selected

	in the area of Maubin, etc.)
6. Target Group	Myanmar's people-workers (total number around 100), road engineers (around 10), road-technicians (around 10), and some road-administrators
7. Activities and Expected Outcomes	<ol style="list-style-type: none"> 1. Establishment of Technical Advisory Committees. 2. Making a Engineering Manual 3. Organizing Road Support and Disaster Prevention Communities 4. Pavement works including non-bituminous treatment and countermeasures against road surface settlement 5. Seminar and Reporting
8. Project Duration	June 2010- December 2012
9. Amount of Estimate	10,000,000yen
10. Implementation Structure of the Project	<ol style="list-style-type: none"> 1. Japan Infrastructure Partners (JIP) The Advisory Committee will be organized in JIP, and its members will carry out the activities under the Project. 2. Myanmar Engineering Society (MES) The Advisory Committee will be organized in MES, and its members will carry out conduct the necessary activities.
II. Outline of the Proposing Organization	
1. Name of the Organization	NPO, Japan Infrastructure Partners (JIP)
2. Main Activities	The Dispatch of the missions and Engineering Exchanges with the South-Asia countries in the Infrastructure field
3 Past Activities and Achievements in the Target Country	<p>JIP has sent the Highway Engineering Missions four times in recent years, and also conducted Engineering & Communication Exchanges with Myanmar's Engineers.</p> <p>And many members of JIP were the JICA experts sent to Myanmar for BETC Project in 1980-85, and since then the friendship exchange with Myanmar engineers has continued in various times. So JIP has good relationship with Myanmar Engineers concerned with.</p>

Attachment-3 : Roll Shearing of Activities

Activities		Cost is shouldered by Myanmar	Cost is shouldered by Japan
Technical Advisory Committees	Establishment of Technical Advisory Committees respectively in Myanmar and in Japan	-	-
	The 1st, 2nd and 4th Joint Technical Advisory Committee Meetings held in Myanmar	-	0
Making an Engineering Manual	The 3rd Joint Technical Advisory Committee Meeting held in Japan	-	0
	Drafting an Engineering Manual on Pavement Works	-	0
	Translating the Engineering Manual into Myanmarese	0	-
	Following up the Engineering Manual based on the results of the road construction works	-	0
Organizing Road Support & Disaster Prevention Communities	Printing the Engineering Manual	-	0
	Exchanging opinions between Myanmar and Japan on the organizing and employment of the Communities	-	-
	Organizing the Communities for participation to the road construction works by MES and PW	-	-
	Educating the people of the Communities on surface treatment works, maintenance, tentative rehabilitation, and evacuation during natural	-	-
	Evaluation of participation and employment of local people	-	-
	Surveying, planning, designing and scheduling of the works	0	-
Pavement works including non-bituminous treatment and countermeasures against road surface settlement	Japanese expert's fielding to the road construction site		0
	Carrying out road pavement works	0	-
Seminar and Reporting	Reporting to the key officials of PW in order for them to understand the necessity/efficiency of the local communities' participation	-	-
	Holding a Seminar in Myanmar	0	0
	Making and submitting to JICA of the Project Completion Report	-	0
	Making press releases	0	-

5. Answers to the Questionnaire from JICA

The Team carried a questionnaire from JICA, and discussed with MES, PW on it, and jointly made answers as follows.

1. JICA understands that the Project aims technical transfer of the “light traffic pavement” or “low cost pavement” constructed by “people-participating-type” method, but JICA needs a little more detailed information on such pavement. Is such pavement a high embankment type in order to protect it from floods, or not a high embankment but a re-usable type even after floods? And please inform JICA of the reason why such pavement type is selected.

PW has almost completed the embankments of planned some 660 km roads, but due to the very soft ground in Ayeyawady area, it is very difficult to stop their surface's settling. Therefore, PW is now making efforts to keep heights of road surface by filling up earth material and temporarily carrying out gravel pavement instead of bituminous treatment. In order to overcome these difficulties, a manual for labour-intensive-type surface treatment works is much needed.

2. The Project's objective is understood to be pavement technology transfer. If so, does the Project site have to be the disaster area of the Cyclone?

People of Ayeyarwady area suffered from serious damages of cyclone and still remain in poor situation. Therefore, it is quite urgent to provide this area with stable roads. With this in mind, technical cooperation for road surface treatment in this area seems appropriate.

3. JICA agrees that the “people-participating-type” method can mobilize the manpower of regional communities' people to increase their job opportunities, but do PW and PES have any experience of the methods of this kind? JICA thinks that people have to be paid by cash, but is such payment possible in Myanmar?

In the case of this area, PW is carrying out directly construction works instead of hiring private companies, which mean PW has to directly employ local people. Therefore, PW has an experience to mobilize local people and can pay them by cash.

4. In relation to the points 2 & 3 above, does JIP, through the Project, want to:
- (i) transfer the technique of "light traffic pavement" or "low cost pavement" by the "people-participating-type" method, or;
 - (ii) construct roads which people in disaster affected area can use?

Both.

5. What is the cost of road pavement works in Myanmar? And how much cost can be reduced by the proposed "people-participating-type" method?

Generally speaking, the cost of labour-intensive type construction method is cheaper than that of machinery-oriented method. But we have not yet measure the actual amount of their difference.

6. What kind of manual is going to be made under the Project? Is it specialized to only pavement, or to pavement, subgrade and so on? Or, does it also include the management of the "people-participating-type" method?

There is a model project conducted in Mongol. It is a comprehensive technical manual, covering from designing, construction including earthworks, embankment, quality control up to maintenance under the labour-intensive concept. But circumstances including climate, soil condition in Myanmar are quite different from those in Mongolia. As of now, we are thinking to make the Myanmar version of that Manual in this project, although we assume that the Manual will be a kind of first draft only due to the limited Project budget and time.

7. Which section of MES is the Project's counterpart of Myanmar? Which section of PW will be transferred the technology through the Project? How much discussion did PW, MES and JIP actually have on the Project, particularly on cost sharing, type of pavement, people-participating, and so on? Also, please provide JICA with present situation of pavement works in Myanmar, road maintenance plan after the implementation of the Project, budgeting perspective, and so on.

The Chairman of MES, U Han Zaw will be the official counterpart of the Project. Implementation organization for this Project will be RCSU or Road Construction Special Unit of PW and Road Research Laboratory. The table of Myanmar' and Japan' cost sharing on Project activities is attached hereto(see

bAttachment-3 of section 4.). Regarding the pavement type, as stated No.1 above, non-bituminous treatment is implemented because embankment is still unstable, but after the stabilization of the embankment, road surface is going to be treated with bitumen. For other issues, please refer to the Report of the Study Team.

別紙-1

Ayeyarwady-Delta Region, Human Resources Development Project of the Labour-intensive-type Road Lightly Trafficked Road Surface Treatment ,
in order to increase the job opportunities for local people

Activities		Cost is shouldered by Myanmar	Cost is shouldered by Japan
Technical Advisory Committees	Establishment of Technical Advisory Committees respectively in Myanmar and in Japan	-	-
	The 1st, 2nd and 4th Joint Technical Advisory Committee Meetings held in Myanmar	-	0
	The 3rd Joint Technical Advisory Committee Meeting held in Japan	-	0
Making an Engineering Manual	Drafting an Engineering Manual on Pavement Works	-	0
	Translating the Engineering Manual into Myanmarese	0	-
	Following up the Engineering Manual based on the results of the road construction works	-	0
	Printing the Engineering Manual	-	0
Organizing Road Support & Disaster Prevention Communities	Exchanging opinions between Myanmar and Japan on the organizing and employment of the Communities	-	-
	Organizing the Communities for participation to the road construction works by MES and PW	-	-
	Educating the people of the Communities on surface treatment works, maintenance, tentative rehabilitation, and evacuation during natural	-	-
	Evaluation of participation and employment of local people	-	-
Pavement works including non-bituminous treatment and countermeasures against road surface settlement	Surveying, planning, designing and scheduling of the works	0	-
	Japanese expert's fielding to the road construction site		0
	Carrying out road pavement works	0	-
Seminar and Reporting	Reporting to the key officials of PW in order for them to understand the necessity/efficiency of the local communities' participation	-	-
	Holding a Seminar in Myanmar	0	0
	Making and submitting to JICA of the Project Completion Report	-	0
	Making press releases	0	-

Annual Budget Allocation for Construction of Roads for the whole country

Year (Kyats in million)	Road (Kyats in million)
1999-2000	4485.14460
2000-2001	6110.39833
2001-2002	7721.39570
2002-2003	17364.12318
2003-2004	27817.15000
2004-2005	29800.70000
2005-2006	31840.76000
2006-2007	50951.56380
2007-2008	835307.88000
2008-2009	794809.86180
2009-2010	1555526.44000
2010 March - Oct;	1455036.29000

Budget allotted for the special maintenance of roads and bridges
from 1988-89 to 2009-10

Kyats (Millions)

Sr. No.	Budget Year	Orginal	Supplementary	Total
1	1988-89	267.350	6.25688	273.60688
2	1989-90	277.660	232.47400	510.13400
3	1990-91	295.422	606.12400	901.54600
4	1991-92	268.780	655.97100	924.75100
5	1992-93	260.300	689.43590	949.73590
6	1993-94	427.450	119.75000	547.20000
7	1994-95	903.050	849.35300	1752.40300
8	1995-96	1297.000	340.00000	1637.00000
9	1996-97	1446.000	345.00000	1791.00000
10	1997-98	1695.000	2000.00000	3659.00000
11	1998-99	2995.000	1500.00000	4495.00000
12	1999-2000	3692.000	2150.00000	5842.00000
13	2000-2001	4785.000	3624.71400	8409.71400
14	2001-2002	5154.656	5514.71258	10669.36858
15	2002-2003	6770.000	9001.00000	15770.00000
16	2003-2004	7975.000	6679.86700	14654.86700
17	2004-2005	9040.74917	9999.77840	19040.52757
18	2005-2006	10786.90580	4000.00000	14786.90580
19	2006-2007	14984.25134	9000.00000	23984.25134
20	2007-2008	15010.00000	711.67300	15711.67300
21	2008-2009	27596.80000	-	27596.80000
22	2009-2010	26596.80000	-	-
23	2010-2011	25554.88100	-	-

11 Roads at Ayeyarwaddy Delta Region

Budget of 2008- 2009

Kyats (Millions)

No.	Name of Road	Budget	Special Budget	SG	Total
1	Maubin-Yelagale-Shwedaungmaw-Kyaikpi-Mawlamyinegyun Road	2090.00	2500.00	1250.00	5840.00
2	Mawlamyinegyun – Hlaingbone- Thitpoak – Kwinpouk- Pyinzalu Road	-	-	7500.00	7500.00
3	Labutta- Tingangyi – Pyinzalu Road	360.00	4000.00	5000.00	9360.00
4	Labutta- Thongwa- Oaktwin- Hteiksun Road	-	-	6000.00	6000.00
5	Bogale-Kyeinchaung- Katonkani Road	-	3500.00	7000.00	10500.00
6	Bogale- Setsan- Htawpine- Ama Road	-	-	-	0.00
7	Pyapon- Kyaonkadun- Dawyein – Ama Road	-	-	4470.00	4470.00
8	Kyaonkadun- Setsan Road	-	-	-	0.00
9	Pathein- Thalaikhwa- Mawtinsun Road	-	-	-	0.00
10	Bogalae- Mawlamyinegyun- Wakema_ Myaungmya Road	-	-	-	0.00
11	Pathein- Ngapudaw Road	-	-	-	0.00
Total		2450.00	10000.00	31220.00	43670.00

11 Roads at Ayeyarwaddy Delta Region

Budget of 2009-2010

Kyats (Millions)

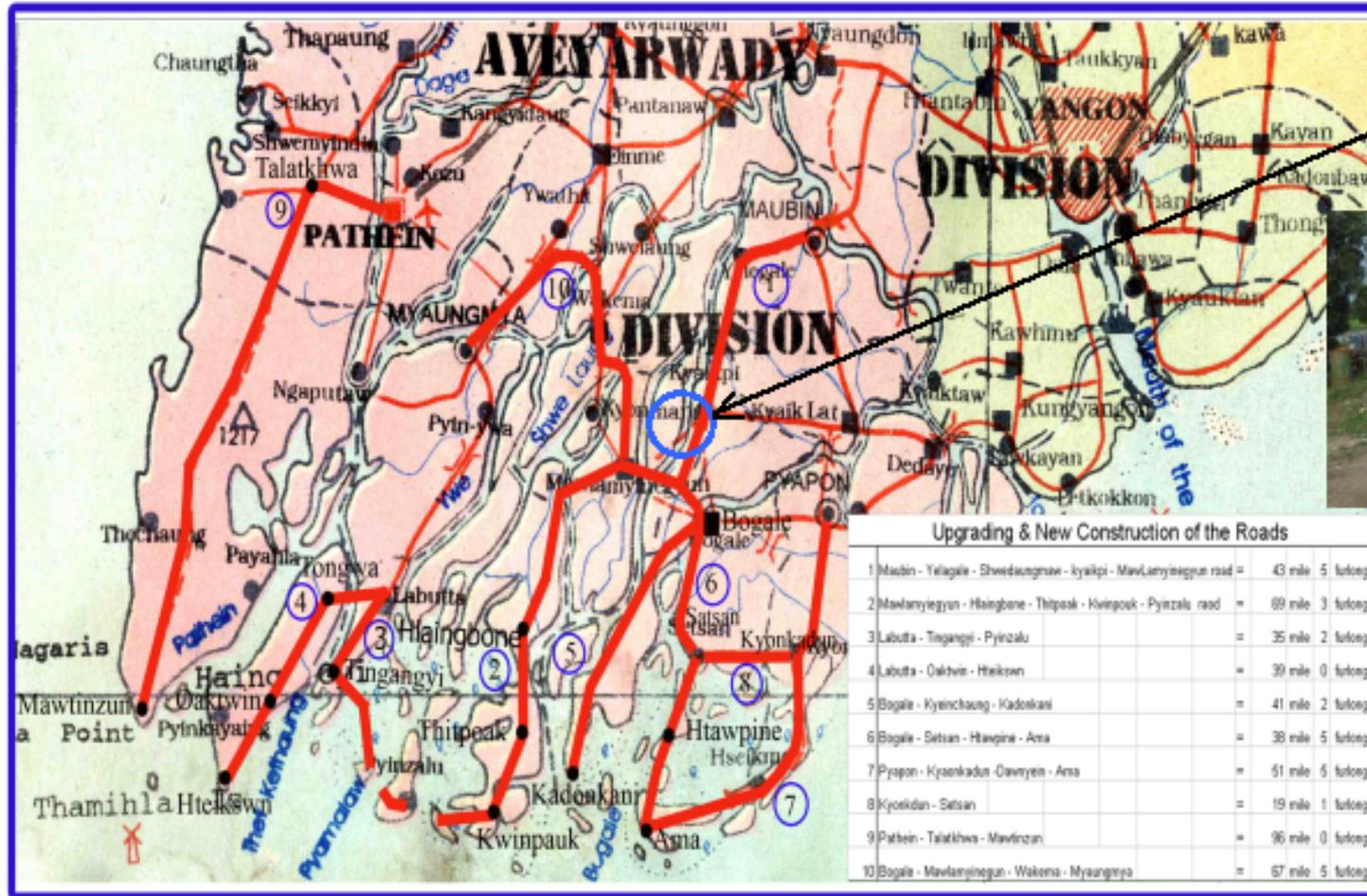
No.	Name of Road	Budget	SG	SSG	Total
1	Maubin-Yelagale-Shwedaungmaw-Kyaikpi-Mawlamyinegyun Road	750.00	600.00	2439.00	3789.00
2	Mawlamyinegyun – Hlaingbone- Thitpoak – Kwinpouk- Pyinzalu Road	12500.00	-	4365.75	16865.75
3	Labutta- Tingangyi – Pyinzalu Road	10000.00	-	-	10000.00
4	Labutta- Thongwa- Oaktwin- Hteiksun Road	7220.00	-	1630.00	8850.00
5	Bogale-Kyeinchaung- Katonkani Road	18000.00	-	-	18000.00
6	Bogale- Setsan- Htawpine- Ama Road	4297.00	1700.00	1625.00	7622.00
7	Pyapon- Kyaonkadun- Dawyein – Ama Road	2240.00	-	-	2240.00
8	Kyaonkadun- Setsan Road	340.00	-	534.00	874.00
9	Pathein- Thalaikhwa- Mawtinsun Road	-	-	124562.00	124562.00
10	Bogalae- Mawlamyinegyun- Wakema_ Myaungmya Road	-	-	300.00	300.00
11	Pathein- Ngapudaw Road	-	-	-	0.00
Total		55347.00	2300.00	135455.75	193102.75

**11 Roads at Ayeyarwaddy Delta Region
Budget of 2010- 2011**

Kyats (Millions)

No.	Name of Road	Budget
1	Maubin-Yelagale-Shwedaungmaw-Kyaikpi-Mawlamyinegyun Road	5735.00
2	Mawlamyinegyun – Hlaingbone- Thitpoak – Kwinpouk- Pyinzalu Road	10000.00
3	Labutta- Tingangyi – Pyinzalu Road	2230.00
4	Labutta- Thongwa- Oaktwin- Hteiksun Road	12455.00
5	Bogale-Kyeinchaung- Katonkani Road	3375.00
6	Bogale- Setsan- Htawpine- Ama Road	5735.00
7	Pyapon- Kyaonkadun- Dawyein – Ama Road	1825.00
8	Kyaonkadun- Setsan Road	2015.00
9	Pathein- Thalaikhwa- Mawtinsun Road	86320.00
10	Bogalac- Mawlamyinegyun- Wakema_ Myaungmya Road	1985.00
11	Pathein- Ngapudaw Road	-
Total		131675.00

Road Network Development Map of Ayeyarwady Delta Area



試驗施工場所
Pilot work site



