ANNUAL REPORT 2019

DEPARTMENT of HIGHWAYS





cover : *Landscape of Constrution*
Inter – City Mortorway No.6 Bang pa-in - Nakhon Ratchasima





His Majesty King Maha Vajiralongkorn Bodindradebayavarangkun's Remarks Given to Civil Servants on the Occasion of the Civil Servant's Day, 1 April 2019

There are 2 things that all civil servants should persist in, first is the country's benefit and another is integrity. The country's benefit is the highest achievement of civil work while integrity is both fundamental and course of action to reach the goal.

Preface



Throughout 107 years, Department of Highways is the organization which develops the infrastructure, connects transportation networks; land, water, air and rail transports, and supports country steering in economy, society, culture, technology and security through connected highways network 1,532 routes in the distance of 51,841 kilometers. Presently, Thailand already connected highways network throughout the country. Department of Highways is aware of the important mission which is the utmost benefit of people according to the government policy as in vision of the department stated that "highway system which is convenient, safe and linked with infrastructure development of the country."

In the fiscal year 2019, the department significantly forereached various crucial projects such as the construction project of inter-city motorway in 3 routes which are motorway no.6 : Bang Pa-in - Nakhon Ratchasima in the distance of 196 kilometers and the construction works expected to be completed in 2020, motorway no.7 : Pattaya – Maptaphut that opened in July 2019, motorway no.81 : Bangyai – Kanchanaburi that the department has achieved the process of land ownership or surrender the right in land to state and adjusted the construction plan to be completed in April 2023 together with the operation and maintenance system and it will be fully opened by the end of 2023. Moreover, there are highway construction projects on several routes, the primary highway expansion project to be 4 lanes, the traffic solution in Bangkok, Greater Bangkok and main city, the highway linkages to neighboring country project, the economic corridor supporting project, and the Eastern economic corridor (EEC) project, etc.

Apart from the construction work, the department is also responsible for highway maintenance in order to make it effectively uses and be safe for the users and there are also other assigned works by the government from the reliability in the potential of the officers of the department as can be seen in the flood from Tropical Storm Podul. Department of Highways was the unit which reached to the area, provided transport assistance to people, built bridge and bailey bridge for transportation. This is the intention of all officers of the department to achieve its goal which is "People receive the convenience, rapid, and safety in highway transport"

Working Team

Department Of Highways (DOH)



Mae Sot Border Control
Facility 2

contents

3 Preface

5 contents



8 Ministry of Transport's executives

12 Department of Highways executives



14 Duties and Responsibilities





15 Strategy of Department of Highways in 2017-2021



19 Department of Highways Organization Chart



20 History of the Department of Highways



22 Finance

42 Operation Highway Projects 2019



64 Completed Highway Construction in Fiscal Year 2019





126 Activities



128 Publication Committee



The Second Thai – Myanmar Friendship Bridge ,
Mae Sot District



GENERAL PRAYUTH CHAN-OCHA

PRIME MINISTER

MINISTER
DEPUTY MINISTER



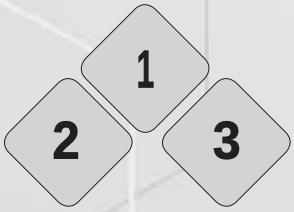




1 MR. SAKSIAM CHIDCHOB
MINISTER OF TRANSPORT

2 MR. THAWORN SENNIAM
DEPUTY MINISTER OF TRANSPORT

3 MR. ATIRAT RATANASATE
DEPUTY MINISTER OF TRANSPORT



PERMANENT SECRETARY
DEPUTY PERMANENT SECRETARY









1 2 3 4

1 MR. CHAIWAT TONGKAMKOON
PERMANENT SECRETARY

2 MR. PISAK JITVIRIYAVASIN
DEPUTY PERMANENT SECRETARY

3 MR. PERAPHON THAWORNSUPACHAROEN
DEPUTY PERMANENT SECRETARY

4 MR. ANON LUANGBORIBOON
DEPUTY PERMANENT SECRETARY

DEPARTMENT OF HIGHWAYS

EXECUTIVE 2019



1 **MR. ANON LUANGBORIBOON**
DIRECTOR GENERAL

2 **MR. TAWEE GASISAM-ANG**
DEPUTY DIRECTOR GENERAL FOR ADMINISTRATION

3 **MR. APICHART JUNTARASUP**
DEPUTY DIRECTOR GENERAL FOR ENGINEERING

4 **MR. APISIT PROMSEN**
DEPUTY DIRECTOR GENERAL FOR MAINTENANCE

5 **MR. KAMON MUNTOM**
DEPUTY DIRECTOR GENERAL FOR OPERRATION

DEPARTMENT OF HIGHWAYS
EXECUTIVE 2019











6 7 8 9 10

6 **MR. CHATCHAI CHUANGCHING**
CHIEF ENGINEER FOR MAINTENANCE

7 **MR. PRAMON SATHAPORNNANON**
CHIEF ENGINEER FOR LOCATION AND DESIGN

8 **MR. PARINYA SAENGSUWAN**
CHIEF ENGINEER FOR CONSTRUCTION

9 **MR. VANCHAK CHAYAKUL**
CHIEF ENGINEER FOR HIGHWAY SAFETY

10 **MR. SITTICHAI BOONSAAT**
CHIEF ENGINEER FOR PLANNING

DEPARTMENT OF HIGHWAYS

CURRENT TEAM



1 2 3 4

1 MR. SARAWUT SONGSIVILAI
DIRECTOR GENERAL

2 MR. APISIT PROMSEN
DEPUTY DIRECTOR GENERAL FOR MAINTENANCE

3 MR. APICHART JUNTARASUP
DEPUTY DIRECTOR GENERAL FOR ENGINEERING

4 MR. APIRAT CHAIWONGNOI
DEPUTY DIRECTOR GENERAL FOR OPERRATION

DEPARTMENT OF HIGHWAYS

CURRENT TEAM



5 **MR. CHATCHAI CHUANGCHING**
CHIEF ENGINEER FOR MAINTENANCE

6 **MR. PRAMON SATHAPORNNANON**
CHIEF ENGINEER FOR LOCATION AND DESIGN

7 **MR. PARINYA SAENGSUWAN**
CHIEF ENGINEER FOR CONSTRUCTION

8 **MR. VANCHAK CHAYAKUL**
CHIEF ENGINEER FOR HIGHWAY SAFETY

9 **MR. SATITPONG APIMETEETAMRONG**
CHIEF ENGINEER FOR RESEARCH AND DEVELOPMENT

10 **MR. SITTICHAI BOONSAAT**
CHIEF ENGINEER FOR PLANNING

Duties and Responsibilities



The Department of Highways is responsible for:

1. Enforcing highway laws and other involved laws, especially on motorways, national highways and concession highways.
2. Research and development , renovation and maintenance of the motorways, national highways and concession highways.
3. Cooperating with domestic and international organizations regarding highway issues.
4. Other duties as appointed by law, the Ministry of Transport, and the cabinet.

Strategy of Department of Highways in 2017-2021



Vision

"*Safe and Convenient Highway System Connected to the Development of Infrastructure in Thailand*"

Mission

1) To develop connectivity, accessibility and mobility of Highway System for supporting economic and social movement in country.

2) To maintain serviceability and safety standard of highway for enhancing safety service of country's transportation.

3) To develop Organization Management based on governance system.

Value

"H I G H W A Y S"

"Performance Creation and Technology Integration with Appropriated Knowledge, Honesty, Work with good knowledge, Responsibility, Payattention on service and Synergy"

(1) High performance
(2) Intelligent technology
(3) Good knowledge
(4) Honesty
(5) Work smart
(6) Accountability
(7) Year-round commitment
(8) Synergy







Culture

"D O H"

(1) Deliver Good Service to People
(2) Obligate Governance and Sustainability
(3) Hold Accountability for Interests of Nation and People

Strategy

Strategy 1 :
Highway System Development

The strategies to efficiently develop the connectivity, accessibility and mobility of Highway System are as follows;

1) To develop and improve highway system in order to meet the demand of local, region and country.

2) To develop and improve highway system in order to support Special Economic Zone, tourism, boarder trading and security.

3) To enhance flow of highway system and to develop connectivity of transportation.

4) To develop and increase efficiency of Public Private Partnership, design, right of way and environmental process.

5) To develop and improve Highway standard and principle including design, construction, supervision, maintenance, safety and service.

6) To develop and support research, innovation, technology, information technology (IT), and integration of digital technology.





Strategy 2 :
Service Level

The Strategies for maintaining the standard of serviceability are as follows;

1) To develop and increase efficiency of highway system maintenance.

2) To develop and increase efficiency of problem solving of disaster on highway.

3) To develop and increase efficiency of traffic weight control management for logistics and transportation.

4) To develop and increase efficiency of service.

5) To develop and increase efficiency of maintenance of landscape, shoulder, sidewalk, and local/public participation.

6) To develop and support research, innovation, technology, information technology (IT), and integration of digital technology on maintenance and other services on highway.

Tinsulanonda Bridge, Songkhla District

Strategy 3 :
Safety

The strategies to improve safety of highway system are as follows;

1) To develop and increase efficiency of accident protection.

2) To develop and improve accident reduction on highway.

3) To develop and increase efficiency of usage and activity management on right of way, shoulder and sidewalk including using of public property.

4) To develop and support public relations (PR) and knowledge in highway safety regulations, value and discipline.

5) To develop and increase efficiency of traffic control and related system.

6) To develop and support research, innovation, technology, information technology (IT), and integration of digital technology on highway safety.



Chalong junction tunnel , Phuket Province



Motorway No.6
Bang Pa-in – Nakhon Ratchasima

Strategy 4 :
Management

The strategies to develop and support governance and sustainable organization management are as follows;

1) To develop and support strategy movement and review including planning, project and activity development.

2) To develop and increase efficiency of procurement, machine management, public relations (PR) and organization operation.

3) To develop and support preparation of infrastructure and digital technology of organization.

4) To develop and support human resource management and knowledge and experience dissemination.

5) To develop and support research, innovation, and improvement and update of law, rule, regulation and practice.

6) To develop and support environmental management, local participation, claim management and administration management base on governance system.

Department of Highways Organization Chart

Director General

Office of Administrative System Development

Office of Internal Auditor

Deputy Director General (Engineering)

- Bureau of International Highways Cooperation
- Bureau of Material Analysis and Inspection
- Information Technology Center
- Bureau of Highway Standard and Evaluation
- Inter-City Motorway Division
  - Inter-City Motorway District

Deputy Director General (Administration)

- Office of the Secretary
- Finance and Accounting Division
- Procurement Division
- Personnel Division
- Training Division
- Bureau of Legal Affairs

Deputy Director General (Operations)

- Bureau of Mechanical Equipment And Communication
- Bureau of Right of Way
- Bureau of Highway Construction 1
- Bureau of Highway Construction 2
  - Road Construction Training Center

Deputy Director General (Maintenance)

- Bureau of Highways Maintenance Management
- Office of Highways 1-18
  - Highway District (104)

Chief Engineer (Planning)

- Bureau of Planning

Chief Engineer (Research and Development)

- Bureau of Road Research And Development

Chief Engineer (Construction)

- Bureau of Bridge Construction
  - Bridge Construction and Rehabilitation Center (1-4)

Chief Engineer (Maintenance)

- Office of Traffic Weight Control
- Highway Police Division

Chief Engineer (Location and Design)

- Bureau of Location and Design

Chief Engineer (Highway Safety)

- Bureau of Highway Safety

History of the Department of Highways





The Department of Highways was established as a department on 1 April 1912. Formerly, there was only the Department of Canals, which was subjected to the Ministry of Agriculture. Until the reign of King Rama VI, a royal decree transferred the Department of Canals to the Ministry of Public Works and renamed the "Department of Highways". The Ministry of Civil Engineering itself was also renamed the "Ministry of Communication" by a decree issued in the same year regarding bureaucracy restructuring.

On 30 September 1914, the Waterways Section of the Department of Highways was transferred to The Ministry of Agriculture, and renamed the "Royal Irrigation Department". Therefore, only the Division of Roads remained under the Department of Highways which was headed by a Director-General.

On 30 July 1917, after Thailand declared war against Germany, Austria and Hungary, a royal decree was issued to merge the Department of Highways with the Department of Railways under the Ministry of Commerce and Transport which was headed by the Commander of the State Railways. The purpose was to pool the engineers at the country's disposal, as many of the foreign engineers previously employed by both departments were citizens of hostile nations and had been dismissed or interned as prisoners of war. The Chief Road Work Technician was the leader of the Department of Highways at that time.

On 29 June 1932, King Rama VII, with the consent of the People's Party, merged the Ministry of Commerce and Transport with the Ministry of Agriculture. The new agency was named the "Ministry of Agriculture and Commerce". As a result, the Department of Railways, which included the Department of Highways, became a subordinate agency of the new ministry.

On 3 May 1933, at the recommendation of the cabinet, King Rama VII passed an Establishing Ministries and Departments Act B.E. 2476. Under the act, the Ministry of Agriculture and Commerce was dissolved. And the Department of Railways, which included the Department of Highways, became a unit of Ministry of Economic Affairs instead.

On 18 September 1934, King Rama VII, at the recommendation of the House of Representatives, promulgated an act transferring the authority and responsibility regarding the construction and maintenance of highways from the Department of Highways to the Department of Municipal Public Works which was subjected to the Ministry of Interior.

On 19 August 1941, in the reign of King Rama VIII, the Division of Roads was upgraded to a department and was transferred from the Department of Municipal Public Works which was a part of the Ministry of Interior, to the Ministry of Communications, under Ministerial and Department Restructuring Act B.E.2484. Although, it was upgraded, the new department did not have its own office and was still located within the compound of the Department of Municipal Public Works at the base of Pan Fa Leelart Bridge. Then, on November 13, 1948, it was moved to Rama VI Road where the Division of Procurement of the present Department of Highways is.

On 12 March 1952, under the Ministerial and Department Restructuring Act B.E. 2495, the Department of Highways was renamed the "Department of National Highways". However, it still remained under the Ministry of Transport.

On 24 June 1955, The Department of National Highways had the opening ceremony for the office building on Sri-Ayutthya Road.

On 4 May 1963, The Department of National Highways was renamed the "Department of Highways" again and transferred to the Ministry of National Development, under the Ministerial and Department Restructuring Act B.E. 2506.



On 29 September 1972, the Department of Highways was transferred to the Ministry of Transport and it has remained there until present day. The transfer was made according to the following laws:

- The national Executive Council Announcement No.216.

- The decree divided Department of Highways , Ministry of Transport B.E.2516

- The decree divided Department of Highways , Ministry of Transport B.E.2532

- The decree divided Department of Highways , Ministry of Transport B.E.2533

- The Ministerial and Developmental Restructuring Act B.E.2534

- The decree divided Department of Highways , Ministry of Transport B.E.2537

- The decree divided Department of Highways , Ministry of Transport (No.2) B.E.2539

- The Ministerial and Developmental Restructuring Act B.E.2545

- The Ministerial division Highways Ministry of Transport B.E.2545

- The Ministerial division Highways Ministry of Transport B.E.2552

- The Ministerial division Highways Ministry of Transport B.E.2558

Finance



In the fiscal year 2019, the government emphasizes the mission in accordance with the National Strategic and Government policy. It aims to the internal country economy be reinforced, decreasing social inequality, expanding people's opportunity to improve quality of life with increasing country's competitiveness and potential of people be strengthened lead to developing in economy, social, culture, stability, natural resources, and environment. The Sufficiency Economy has been applied as guidelines in the budget allocation of the country to attain the greatest benefit for people concretely.

The budget allocation strategy was divided into 6 categories and operational guidelines under strategy contain 62 plans. The budget of the Department of Highways was allocated under Strategy 2 was for increasing the country's competitiveness. This strategy has been driven by Plan 2.8, Promoting the special economic area plan, Plan 2.9, The integration plan to drive the Eastern Economic Corridor, Plan 2.10, The integration plan to develop the transportation and logistic, Plan 2.16, The Integrated Plan for area development in the region, Plan 2.17, Personnel plan (Increasing the country's competitiveness), Plan 2.18, increasing

the country's competitiveness plan. Strategy 3 was for developing and increasing in a personal capacity. Plan 3.5, Strategic plan to reinforce healthy. In the fiscal year 2019, the budget of the Department of Highways consisted of 7 plans, 3 outcomes, 28 projects, and 1 list. The total budget was 117,138.8497 million baht, more than the previous year by 11,392.6485 million baht or 9.72 percent. The received budget was 65.22 percent of the budget that the Ministry of Transport has received (179,598.6 million baht) or was 6 percent of the national budget (3,000,000 million baht). The budget was allocated as follows:

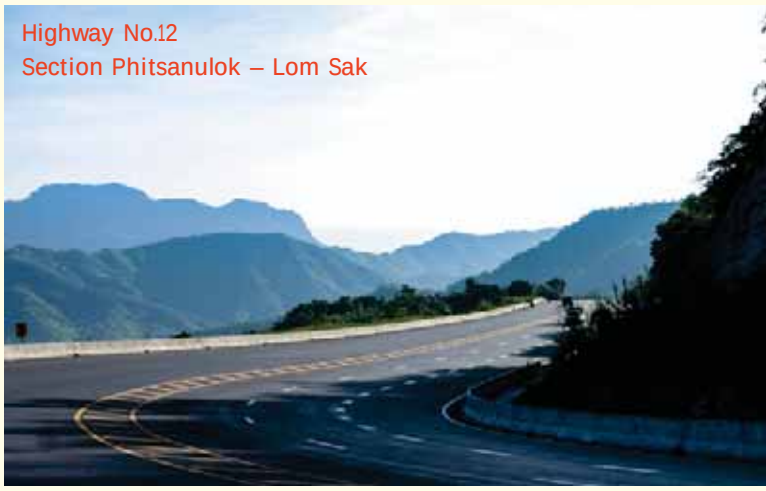
The Personnel budget is the expenses for workforce management such as salary, permanent wage, temporary wage, and remuneration. "4,933.2890 million baht"

The Operational budget is the expenses for operation and administration such as remuneration of materials and public utility. "705.8637 million baht"

The Investment budget is the expenses for investment such as permanent equipment, land, real properties, and other related expenses. "110,898.9397 million baht"

Supporting budget is the expenses for supporting local administrative agencies, private organizations, other juristic persons, royal expenses, religion, and other related expenses. "6.7973 million baht"

Other budget is the expense that could not be classified into any budget categories or the budget on which the Bureau of the Budget requires to spend. "493.960 million baht"


Highway No.12
Section Phitsanulok – Lom Sak

Disbursement

In the fiscal year 2019, the government set up the measures and guidelines to accelerate the annual expenditure which not to be less than 75.87 percent of the overall budget and 74.58 percent of the investment budget. The Department of Highways used 73.87 percent of the investment budget and 75.09 percent of the total disbursement. The reason for a late disbursement is some route of the highway's construction has trouble that cannot be constructed. For example, the problem of the Right of Way, the problem of moving and dismantle the public utility, the problem with the Royal Forest Department of restricted plants in highways area, etc. The Department of Highways cannot construct the road because of climate, the contractor wasn't liquid, the construction design have to be adjusted, which made the late obligation. For the one year construction, most of contractor do not ask for payment in advance.

The Report of expenditure budget in the fiscal year 2019

Divided by Plan/Output/Project (Regular Expenses and Capital Expenditure)
Status As of 30 September 2019

Department of Highways
Ministry of Transport

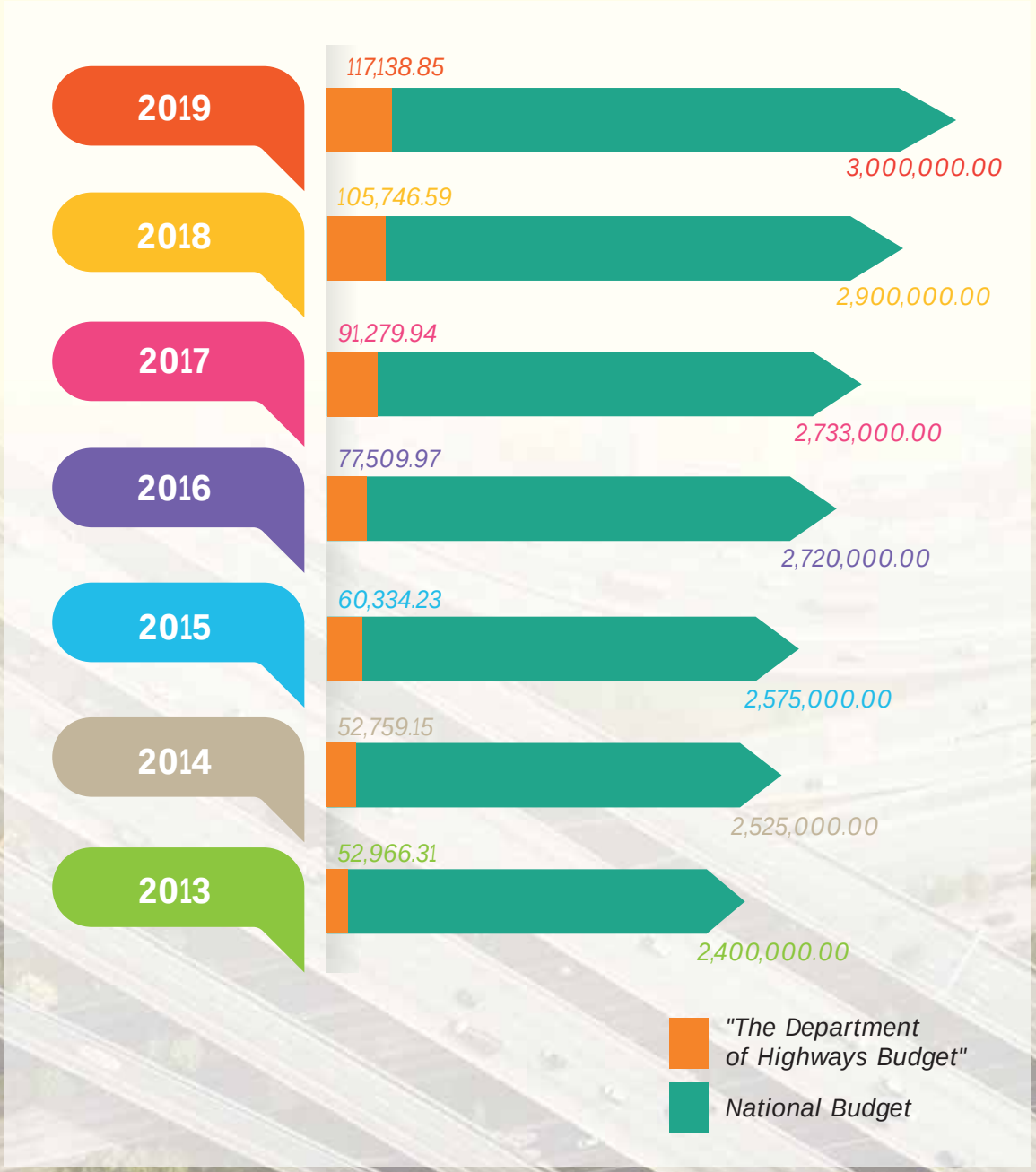
Unit: Baht

Plan/Output/Project	Public Account after Transmitted	Cumulative Disbursements	%
Total	117,167,699,055.22	87,981,638,288.07	75.09
1. Plan : Personnel	5,009,574,655.22	5,007,795,814.52	99.96
Output 1 Personnel cost	5,009,574,655.22	5,007,795,814.52	99.96
2. Plan : Increasing the country's competitiveness	24,793,097,300.00	23,309,880,591.73	94.02
Output 1 Developed Highway Network	1,944,232,193.21	1,480,872,134.48	76.17
Output 2 Maintained Highway Network	19,099,224,797.43	18,349,108,448.71	96.07
Output 3 Safety Highway Network	3,749,640,309.36	3,479,900,008.54	92.81
3. Plan : Strategic plan to reinforce healthy	1,100,000,000.00	986,915,105.54	89.72
Project 1 The project of safety improvement around the school	600,000,000.00	538,110,285.48	89.69
Project 2 The project of promotion on the consumption of domestic natural rubber in the duty of the Department of Highways	500,000,000.00	448,804,820.06	89.76
4. Plan : Promoting the special economic area	4,647,117,600.00	3,094,704,296.86	66.59
Project 1 Highway development for supporting the Special Economic Area	4,647,117,600.00	3,094,704,296.86	66.59
5. Plan : The integration plan to drive the Eastern Economic Corridor	9,802,307,800.00	7,085,305,086.95	72.28
Project 1 Highway development for supporting the Eastern Economic Corridor	9,802,307,800.00	7,085,305,086.95	72.28
6. Plan : The integration plan to develop the transportation and logistic	69,815,601,700.00	47,045,299,551.96	67.39
Project 1 Inter-City Motorway Construction	24,253,177,409.43	12,768,811,981.43	52.65
Project 2 The Construction of International Highways	4,143,134,598.02	3,193,906,704.73	77.09
Project 3 Intersection Safety Improvement project	1,278,256,553.42	1,167,075,476.37	91.30
Project 4 Rehabilitation of Primary Highway Network between the region	3,152,075,443.50	2,693,845,920.98	85.46
Project 5 Construction of railway crossing bridges	921,004,653.52	549,438,656.98	59.66
Project 6 Construction of National Highway Network	29,021,460,434.53	21,024,314,147.38	72.44
Project 7 Highway development for Efficiency Improvement of Traffic and Logistic	3,629,468,907.37	3,083,207,073.56	84.95
Project 8 An Analysis of Public-Private Partnership suitability	70,977,400.00	24,649,678.60	34.73
Project 9 Improving Pavement Marking	296,337,200.21	295,945,641.50	99.87
Project 10 Lane Widening construction of Borommaratchachonnani Elevated Highway	103,039,200.00	25,711,573.41	24.95
Project 11 The Development Project of Rest Area and Highways Weight Control station	844,765,800.00	646,662,786.17	76.55
Project 12 The overpass construction in Highways No.35 Route Thonburi – Pak Tho (Rama II Rd.)	2,101,904,100.00	1,571,729,910.85	74.78
7. Plan : The Integrated Plan for area development in the region	2,000,000,000.00	1,451,737,840.51	72.59
Project 1 The development project of the group of Eco-tourism in the North	87,802,764.00	85,670,036.10	97.57
Project 2 The development project of the tourism group of the World Heritage in the North	169,699,800.00	108,778,816.53	64.10
Project 3 The development project of the tourism group of Lanna culture and ethnic group in the North	215,949,622.00	167,308,954.72	77.48
Project 4 The standardization and connection of transportation networks development for land and air transport	162,630,039.00	16,161,264.15	9.94
Project 5 The Bangkok Metropolitan and urban area development project	36,000,000.00	5,237,934.81	14.55
Project 6 City development project	24,166,506.00	23,410,945.70	96.87
Project 7 The project of development and promotion of historical tourism, religion, and culture	84,948,999.00	84,894,985.27	99.94
Project 8 The development and promotion project of Eco-tourism	111,668,401.00	111,210,282.34	99.59
Project 9 The development project of large-scale Transportation System in the North East	323,147,189.00	249,511,407.72	77.21
Project 10 The project of transportation system development to develop and connect the new tourist attraction with famous tourist attraction	604,791,010.00	420,745,339.45	69.57
Project 11 The prehistoric tourism enhancement project	37,854,450.00	37,852,645.20	100.00
Project 12 Eastern Border Economics Development project	141,341,220.00	140,955,228.52	99.73

Comparison

of The Department of Highways and National Budget

between 2013-2020



The Department of Highways
Statement of Financila Status

Status As of 30 September 2019

Unit: Baht

	Ramark	2019	2018
Assets			
Current Assets			
Cash and cash equivalent	5	3,155,924,620.86	2,985,867,753.64
Short term debtor	6	112,660,735.69	167,220,009.28
Fixed term deposit		-	110,615.79
Inventories		69,637,234.20	60,811,302.82
Other current Assets		1,516,891.79	10,386.50
Total current assets		**3,339,739,482.54**	**3,214,020,068.03**
Non-current assets			
Land ownership		1,272,192,705.58	-
Properties, premises and equipment	7	5,773,926,593.31	5,438,103,930.97
Infrastructure assets	8	332,381,724,975.84	288,000,233,771.34
Intangible assets	9	46,032,106.08	62,980,377.34
Other non-current assets		1,726,104.50	3,646,556.42
Total non-current assets		339,475,602,485.31	293,504,964,636.07
Total assets		342,815,341,967.85	296,718,984,704.10

Remark : Revenue higher than net expense

The Department of Highways
Statement of Financial Status

for the fiscal year ended on 30 September 2019

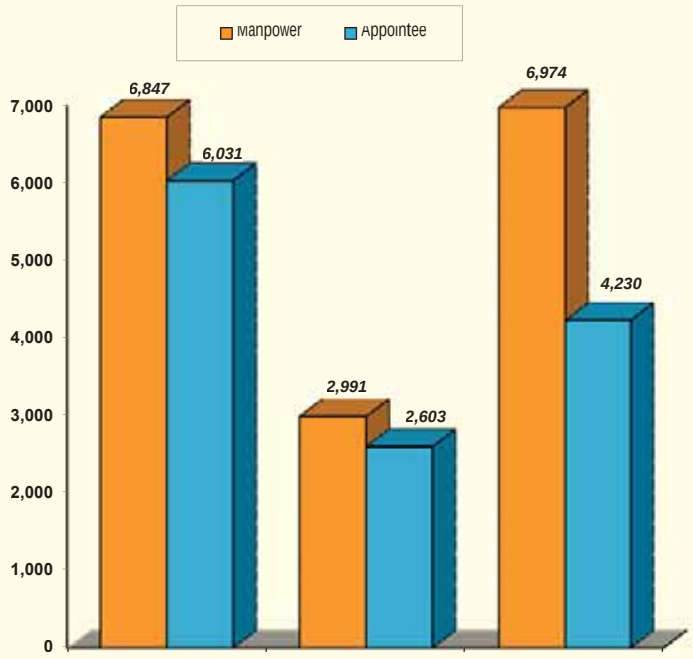
Unit: Baht

	Ramark	2019	2018
Revenue			
National budget	15	105,074,535,645.47	94,219,507,887.86
Loan and other revenues from the government	16	830,858,155.67	770,737,280.23
Sales and services		148,404,259.25	1,331,566,764.88
Support and donation	17	36,853,023.79	27,049,277.90
Others	18	269,812,467.29	170,576,186.08
Total Revenue		106,360,463,551.47	96,519,437,396.95
Expense			
Human resource	19	8,212,690,697.40	8,396,774,842.15
Pension and retirement benefit	20	2,193,384,009.63	2,062,149,567.79
Remuneration		5,258,251.25	6,604,078.85
Supplies	21	25,447,383,220.44	25,740,705,461.05
Materials	22	809,269,281.54	1,542,454,915.48
Utilities	23	276,511,503.32	272,771,537.46
Depreciation and amortization	24	24,226,739,879.83	26,923,966,094.72
Others	25	40,870,172.17	113,412,813.33
Total Expense		61,212,107,015.58	65,058,839,310.83
Revenue higher than net expense		**45,148,356,535.89**	**31,460,598,086.12**

Remark : Revenue higher than net expense

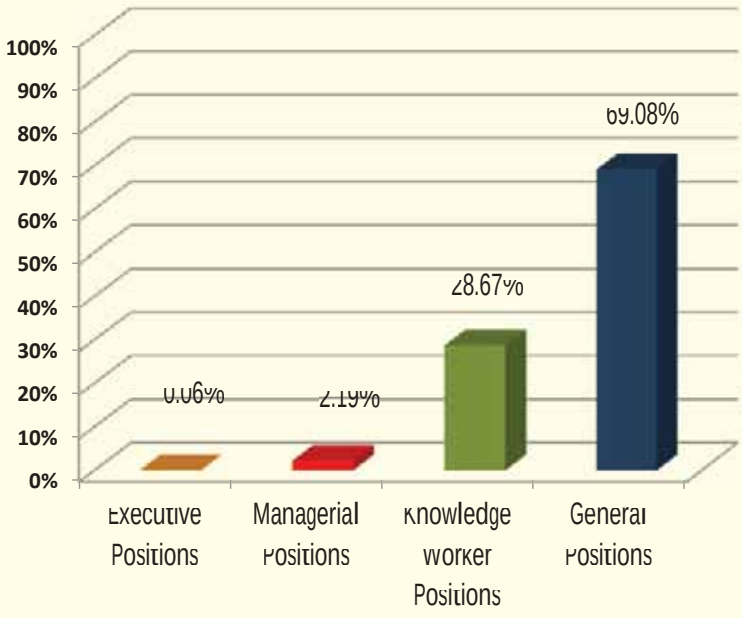
Manpower
Department of Highways

Department of Highways' Manpower,
Dated 30 September 2019

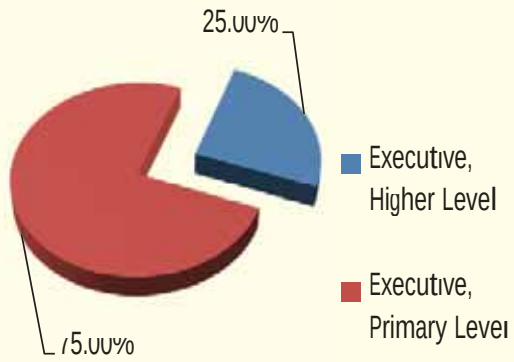


	Officials	Permanent Employee	Government Employee
Manpower	6,847	2,991	6,974
Appointee	6,031	2,603	4,230

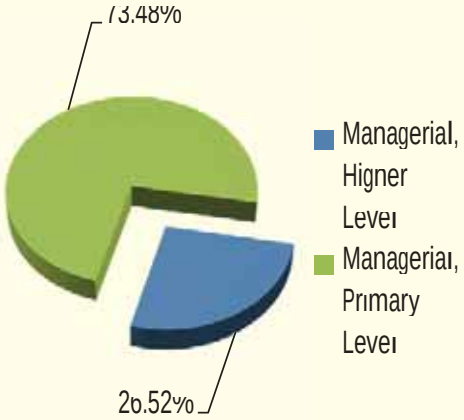
Officials' Manpower, Fiscal Year 2019
Classified by Position and Level



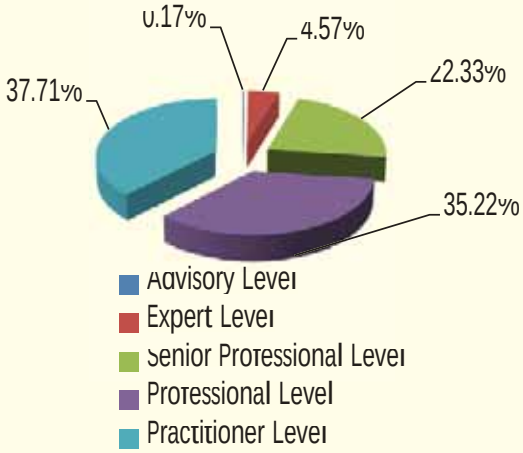
Executive Positions



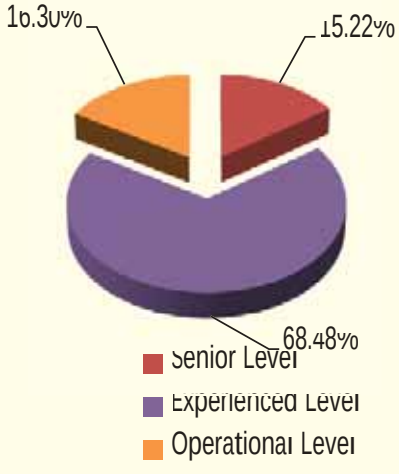
Managerial Positions



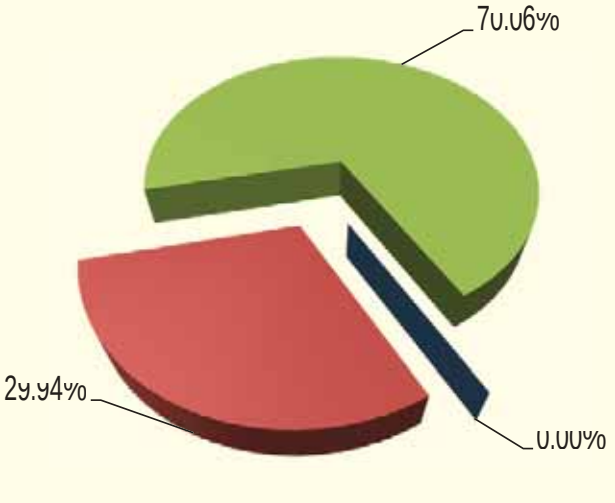
Knowledge Worker Positions



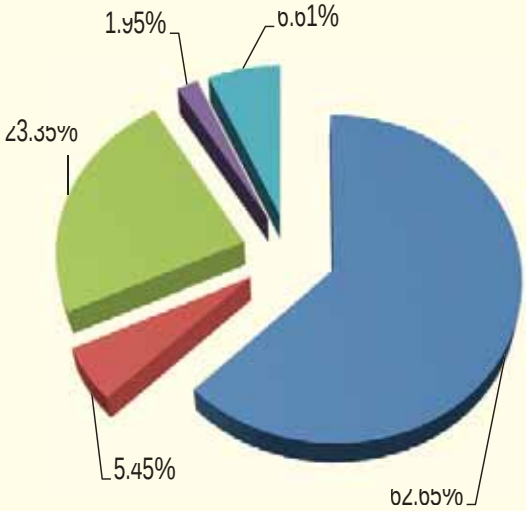
General Positions



Officials and Government Employees Recruitment of the DOH Fiscal Year 2019



DOH's Official Loosing Rate, Fiscal Year 2019



Evaluation Capacity Development



Performance based on indicators

1. The Assessment of government agencies based on measuring and improving the efficiency of the performance of Administrative System of Department of Highways

The Cabinet meeting on 5 April 2016 approved the evaluation of government officials and civil servants in the responsibility of the administration, according to the order of the National Peace Corps (NCC) No. 5/2559 on measures to improve the efficiency of the service. Office of the Public Sector Development Commission was assigned to evaluate capacity development, which was effective on 1 February 2016, and in the meeting of committee of Office of the Public Sector Development Commission No. 3/2017 on 4 September 2018, has approved the framework for evaluation of government agencies in the fiscal year 2019, in accordance with the cabinet resolution on 6 November 2018 as followed;

1. The assessment still has 5 components, with the addition of the integration of many agencies. As in component 1 Function Base

2. Improve evaluation criteria by considering the overall average score of all 5 components, which are divided into 3 levels of assessment criteria which are quality level, standard level (high standard and basic standard) and the level must be improved

3. Adjust the evaluation period to 1 time per year (from 1 October to 30 September of every year) with the objective of evaluating the government according to the measures to improve the efficiency of performing the government services are as follows:

1) To develop the operation system of the government sector in driving important government missions, solving problems and facilitating citizens

2) To increase the potential of government agencies in supporting national development

Performance

The Department of Highways has evaluated the government agencies in accordance with the measures to improve the efficiency of government service in the fiscal year 2019 (from 1 October 2018 to 30 September 2019) with an average score of 76.82 percent. The results are as follows.

Assessment components	Assessment issues	เป้าหมาย Minimum (50)	Standard (75)	High-Level (100)	Working Performance	Score	Score component
1. Function Base	1.Number of Road accident death per hundred thousand population (Joint KPIs) 2.Percentage of distance on highways with an international roughness index of road, which is better than the specified criteria.(IRI not over 3.5)	25.43 (per hundred thousand population) 87.00%	23.18 (per hundred thousand population) 90.00%	20.92 (per hundred thousand population) 92.67%	24.12 (per hundred thousand population) 87.00%	64.56 50.00	57.28
2. Agenda Base	1. Use of rubber as an ingredient in Highway maintenance 2. Clarification of important issues that are up-to-date (if any)	33.33%	66.66% 100 (Score)	100.00%	100.00%	100.00	100.00
3.Area Base	Do not evaluate this component	-	-	-	-	-	-
4.Innovation Base	1. Percentage of handbook for citizens in accordance with the Facilitation Act That the government department can Can reduce the time not less than 30 percent more than 30 percent		100 (Score)		50.00 (Score)	50.00	50.00
5.Potential Base	1. The implementation of the organization reform plan of the government Budget year 2019		100 (Score)		100 (Score)	100	100.00
							Average 76.82 %

Source: https://esar.opdc.go.th/e-SAR/#/login

2. Evaluation of the Executive in fiscal year 2019

According to the Prime Minister's orders on 25 August 2017, The Office of the Public Sector Development Commission (OPDC) follow up the indicators to reform the executive of public sector by giving a special score for those who considered in the appointment or pay compensation. Additionally, the order of the Prime Minister on 26 September 2017, ask the Office of the Public Sector Development Commission (OPDC) set more guidelines for the evaluation of executive of public sector from the normal annual assessment. Then, OPDC will start the assessment of the executives in the first year 2018. There are 10 assessment topics, as follows,

- Topic 1 Energy reduction
- Topic 2 Measure to reduce and separate waste in government agencies
- Topic 3 Budget saving
- Topic 4 Supervision for fraud
- Topic 5 Leadership
- Topic 6 Performance tracking system for managing the organization's operations
- Topic 7 Promoting the use of digital technology in organizations
- Topic 8 Creating morality and ethics in the organization.
- Topic 9 Building morale / caring for subordinates
- Topic 10 Integration of information between departments (Integration)

There are 3 methods of assessment as follows

1. Use assessment results from external agencies. There are 3 issues, including topic 1 Energy Reduction (Energy Policy and Planning Office Ministry of Energy is the evaluator). Topic 2, Measure to reduce and sort waste in government agencies (Pollution Control Department is the appraiser) and topic 4. Corruption Control (Round 1 uses the survey results of subordinates. Section 2, Office of the National Anti-Corruption Commission is an assessor)

2. The Need for Executives enable to self-assessment (self assessment). After the organization executive (Director-General) make self-assessment through the online system of the OPDC, then the OPDC will send the Permanent Secretary to assess. Give a score of 5 points, including topic 3, budget savings, topic 5, leadership, topic 6, performance monitoring system for organization management, topic 7, promotion of technology usage Digital topology in the organization, and topic10 data integration between departments (Integration)

3. Use survey online from subordinates (survey online) in 2 topics, which is topic 8 to build morality and ethics in the organization, and topic 9 to strengthen morale or care for subordinates. The survey respondents are Deputy Director General, Chief Engineer, Director of Bureau / Division which appears in the ministerial regulations or those who holding academic positions from expert level to be the supervisor evaluator.

Assessment cycle is twice a year as follows;

- Round 1, from 1 October to 31 March of every year
- Round 2, from 1 April to 30 September of every year

Performance

The Department of Highways has evaluated the executives in public sector in the fiscal year 2019 (from 1 October 2018 to 30 September 2019). The results are shown as follows.

Topic 1 Energy reduction: Considering 2 types of energy which are electrical energy and fuel energy (The target of country is to reduce by 10 percent)

Report cycle	Percentage of saving results compared with standard values		score		Total
	electricity	Oil	electricity	Oil	
Result round 1	3.29 %	16.97 %	1.5	5.0	6.5
Result round 2	5.91 %	15.70 %	2.5	5.0	7.5

ที่มา : http://www.e-report.energy.go.th/

From the table showing that The Department of Highways has reduced fuel consumption by 10% higher than the target set by the 1st round to reduce 16.97% and the 2nd round to reduce 15.70% respectively. The electrical energy is lower than the target. However, from the report results, it can be seen that the 2nd round of reporting is equal to 5.91% which can save more than Round 1 which is 3.29% which has a higher saving trend. In the fiscal year 2020, guidelines and policies will be established to support and reduce the energy consumption of the Department of Highways to meet the target set.

Topic 2: Measure to reduce and separate waste in government agencies

Office of the Public Sector Development Commission will use assessment results from the Pollution Control Department, Ministry of Natural Resources and Environment, both evaluation cycles (Assessment cycles 1 and 2), where the government must report the results to the Pollution Control Department

- Assessment Round 1, receives 10 points
- Assessment Round 2, scored 9.75 points

Topic 3 Budget saving

Topic 5 Leadership

Topic 6 Performance monitoring system for organization management

Topic 7 Promoting the use of digital technology in organizations

Topic 10 Information integration between departments (Integration)

All 5 topics are self-assessment of the executive of the Department of Highways (Director-General), which the working group of the Office of System Development will prepare the information for the Director-General for self-assessment through the online system of the Office of the Public Sector Development Commission within the period specified by the Office of the Civil Service Commission.

Topic 4 Supervision for fraud

- Assessment Round 1 is based on the survey of the morality and transparency, the supervision of corruption in the government (Survey Online), the results of the survey online, the Office of the Public Sector Development Commission will report directly to the Permanent Secretary, Ministry of Transport who is assessor of executive (Director or equivalent)
- Assessment Round 2, using the result of Integrity & Transparency Assessment (ITA). The evaluation of Department of the Highways has a score of 87.80, which is A level, compared with the criteria, as 9 points.

Topic 8 Creating morality and ethics in the organization.

Topic 9 Building morale / Caring for subordinates

Both assessments are the Survey Online by the target survey respondents: Subordinates shall be the assessor for executive, and must receive at least 80% of the survey results through the system all the whole target group.

- The 1st assessment round, with 90.38% of the respondents out of target group
- The 2nd assessment round, with 91.63% of the respondents out of target group.

In this regard, the scores from the Survey Online assessment, Office of the Public Sector Development Commission will report the results directly to the Permanent Secretary, who assesses them.

Outstanding work

1. Implementation of the act of legislation on Facilitation in approval of Government Authorization Act 2015

According to the policy from the government to facilitate and reduce the burden of the people (Not using a copy of government documents issued by the public sectors), which proposed by the Office of the Public Sector Development Commission and the Cabinet has approved on 2 October 2018, with the following actions:

1.1 The revision of the Handbook for People in accordance with the act of legislation Act 2015, to facilitate the permission of Government8

Department of Highways has updated the Department of Highways' public guide to facilitate people by updating the manual to reduce time and documents. Previously, the Department of Highways had 42 handbooks, now it is able to update into 33 the handbooks. Also, it has been accessed into the public information center of the Office of Office of the Public Sector Development Commission and the Public Sector Development Commission has approval to disclose.

1.2 Cancellation of copies of documents issued by the government in accordance with the government license facilitation Act 2015

The Department of Highways has coordinated to link the data with the relevant agencies. Also, requesting from any agency under the Department of Highways to facilitating the people who asking for the service. By doing this, DOH will prepare the staff to make copies of documents for people. However, on 12 September 2019, DOH delivered a read-device to read data from identification card, namely call Reader Card, along with explaining the usage and installation of the program, canceling the copy of identification card (No Copy) to the agency under Department of Highways in order to facilitate and stop using a copy of the identification card to the people who asking the service.







Human Resource Management of Department of Highways



Human Resource Management has played an important role in supporting the Department of Highways' missions to achieve the goal. This human resource management strategic consistently follows the Department of Highways' mission. The Human Resource Management mechanism covers: reviewing and preparing of strategic plans, organizing human resource management system, improving tasks divided within the internal division and defining responsibilities of each sector, managing workforce, supervising of personnel information, recruiting and appointing of personnel, managing performance for promotion, determining responsibilities, knowledge, abilities, skills and competencies, disciplinary inquiry, promoting morality and ethics of personnel, promoting quality of life, personnel welfare and benefits offering, building relationships among personnel, and funeral assistance including other operation following human resource management policies, exclude the human resource development. As a result, in the fiscal year of 2019, the Department of Highways has performed the following human resource management activities as followed:

1. Supervise and monitor implementation of the Human Resource Strategic Plan during 2017 - 2021 by monitoring the performance from the responsible sector for the project or activities according to the strategic plan on a regular basis, in every 6 and 12 months. The strategic plan emphasizes on strategic management and determines direction in human resource management as well as develops personnel capabilities in order to promote and support the vision and mission of the Department of Highways to achieve the goal with maximum efficiency.

2. Adjust the position determination according to the criteria and methods specify in **the Office of the Civil Service Commission letter** No. NorRor 1008/Wor 2, dated 19 February 2015 to comply with the mission of the department that has changed and to create progress in career path

for the employees. There are 179 positions has been adjusted from general position to knowledge worker position either in principal or supportive position.

3. Review and make job description of the adjusted position according to Wor2/2015. There are 202 positions which are General Administration Officer in Practitioner/Professional Level 26 positions, Supply Analyst in Practitioner/ Professional Level 3 positions, Finance and Accounting Analyst in Practitioner/Professional Level 8 positions, Civil Engineer in Practitioner/ Professional Level 159 positions and Mechanical Engineer in Practitioner/Professional Level 6 positions.

4. Review and specify rules or guidance for human resource management as follows.

4.1 Rule guidelines and method in process of adjustment of general position to knowledge worker position in the position of General Administration Officer in Practitioner Level.

4.2 Guideline for adjustment of general position to Civil Engineer, Practitioner level.

4.3 Guideline for hiring government employee by using government budget

4.4 Guideline for welfare management of Department of Highways

5. Develop IT system for Human Resource and improve and update personnel data base to support human resource management of the department to be more effective by using IT system in human resource management as performance evaluation, collect data for recruitment and selection, process and analyze personnel statistic data, develop cost per product for human resource management as a part of Performance Assessment Rating Tool : PART etc.

6. Continue follow the guideline for Integrity and Transparency Assessment (ITA) in **fiscal year 2019** by making data and document for assessment according to guidance of Office of the National Anti-Corruption Commission. As a result, Department of Highways got the assessment result at 87.80 points which pass the criteria according to Ministry of Transport has specified.

7. Continue to enhance quality of life **of the officer of Department of Highways** in order to create healthy body and mind to ready for work. There is more welfare than the government specification such as subsidized allowance for officers and internal units, shops and restaurants, coffee shop: Café Amazon, health center, cremation welfare etc. Moreover, there are the events to enhance relationship and good atmosphere at work as 5s activity, water-pouring ceremony for the elders in "National Elderly Day, Family Day, and Water Festival (Songkran Day)", making merit, offering food to the monks and listening to Dhamma activities on new year day, offering food to the monks on Foundation Day of the department and sports day etc.

8. Manage High Performance and Potential System Project (HiPPs) by cooperate with Office of the Civil Service Commission to attract and maintain high performance, good officer who work productively for the public to be in government system. This can be counted as the preparation of quality leader who experiences either in management and knowledge. This project selects the officers who qualified and have high potential to engage in the specified development framework and has to pass the assessment according to OCSC's criteria.

9. Organize the outstanding civil servant selection of Department of Highways **in the fiscal year 2018** by select the outstanding civil servant according to rules and guidance of Ministry of Education. There are 5 outstanding civil servants of Department of Highways, 10 civil servants receive consolation prizes and 16 civil servants receives honor certification. The selected civil servant who is nominated the name to Ministry of Education to be the outstanding civil servant selection of Department of Highways in the fiscal year 2018 and will be awarded in Civil Servant Day on 1 April 2019 are Mr. Satitphong Apimeteetumrong, Director of Highway Bureau 15, Mr. Surachet Kuadrhim Civil Works Technician, Senior Level, Nakon Ratchasima Highway District 2 and Mr. Kliean Gongpol, Heavy Mechanical Driver Level Chor2, Lhomsak Highway Construction Center etc.

10. Organize the show of loyalty and respect to royal institution activities

10.1 Organize activities "Practice the Dharma for Royal Merit" in Phrabat Somdet Phra Paramendra Ramadhibodi Srisintra Maha Vajiralongkorn Mahisara Bhumibol Rajavarangkura Kitisirisumburna Adulyadej Sayamindradhipeshra Rajavarodom Borommanat Pobitra Phra Vajira

Klao Chao Yu Hua's birthday. There are activities as making merit by donation, practicing dharma, meditating for royal merit including making merits and singing Tribute to the Great King and Royal Anthem in order to express the intention to be a good civil servant and the strength of the land.

10.2 Organize activity on the occasion of Her Majesty Queen Sirikit, the Queen Mother on the auspicious occasion of her Birthday Anniversary by making merit and dedicate to her majesty.

10.3 Organize the taking oath of allegiance ceremony to be a good civil servant and the strength of the land by take oath of allegiance and sing Royal Anthem in order to express loyalty, your loyal subject is most grateful for Your Majesty's boundless and gracious kindness and intention to be a good civil servant and the strength of the land.

11. Enhance the moral and ethical awareness of personnel as well as promotes prevention and suppression of corruption and misconduct in the public sector as follows.

11.1 Driven Implementation of the action plan to promote moral, ethics and prevention of corruption and misconduct in the public sector of the Department of Highways by providing programs or activities aimed to enhance moral and ethics awareness to personnel of the Department of Highways and insist on behaving, conducting and performing work under government regulations, campaigning to raise an importance of participation in anti-corruption in the Public Sector along with knowledge building and understanding of performing work tasks based on the principles of Good Governance.

11.2 Continue to organize activity on enhancing the moral and ethical awareness of personnel as well as promotes prevention and suppression of corruption and misconduct in the public sector as listening to Dharma and practicing Dharma on every Wednesday, Religious Day activity etc.

11.3 Provide the virtue and merit enhancing project to the Department of Highways' personnel as follows

- 1st field trip to Royal Initiated Project "Carry on the Father of the nation's Determination" at Huay Smong Project, Prachin Buri Province on 21 February 2019
- 2nd field trip to follow the footstep of the late king at Sea Turtle Conservation Center, Royal Thai Army, Chonburi Province on 28 June 2019.
- 3rd field trip to "The Royal Initiated Huay Ong Kod Project", Kanchanaburi Province on 30 August 2019.

12. Organize clarification meeting and reestablish the understanding in human resource management implementation of Department of Highways to build the clear understanding and working in the same standard through the activities as follow.

12.1 Organize the clarification meeting on rules, guideline and process of the level adjustment of civil servant who pass the examination in position of General Administration, Practitioner Level on 13 December 2018

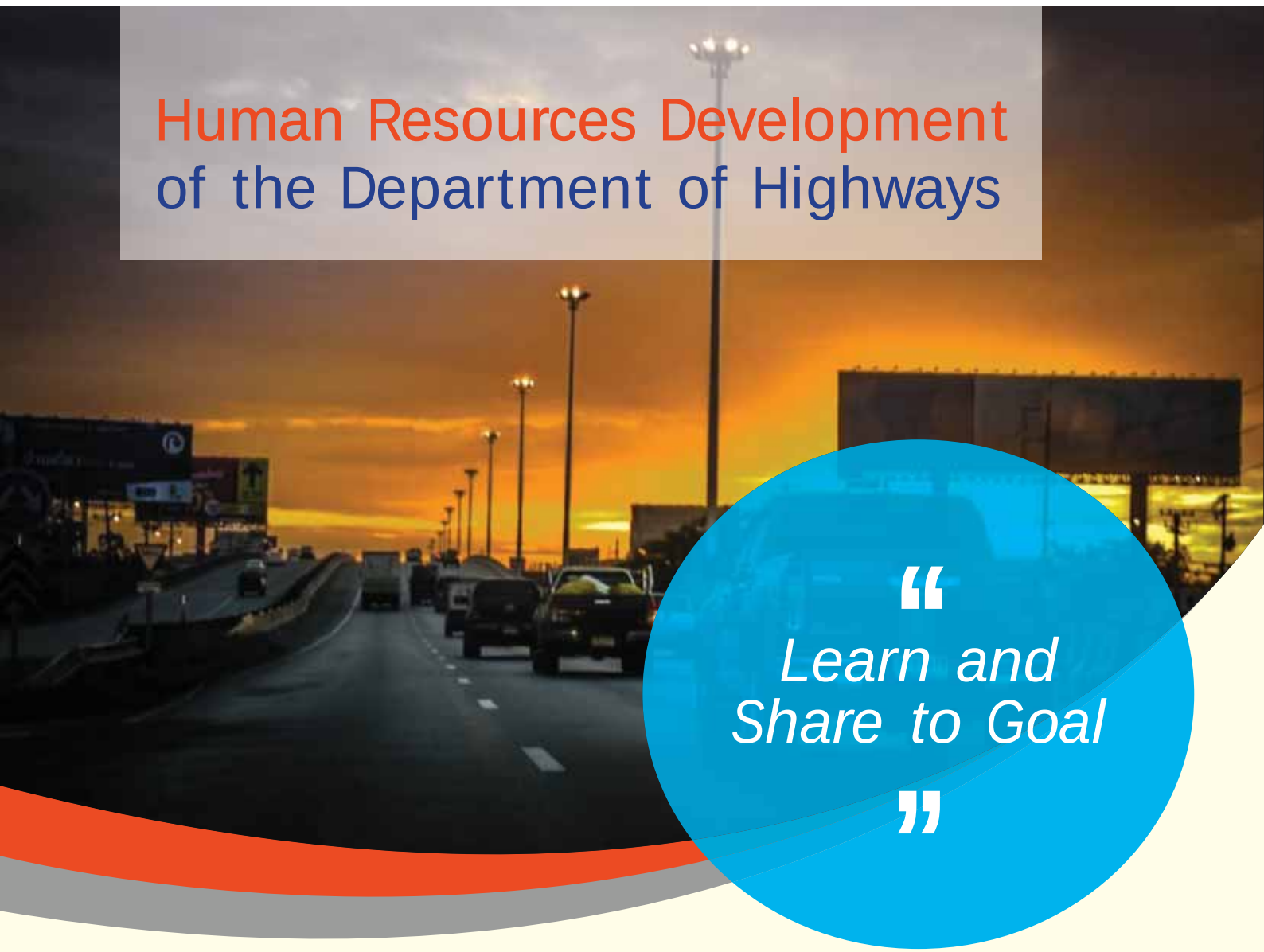
12.2 Organize the clarification meeting on guideline for pension replacement on 25 December 2018

12.3 Organize clarification meeting and reestablish the understanding on rules, performance and outcome assessment method in order to promote to be in an academic position in Professional and Senior Professional Level for the officer in academic position in supportive work on 8-9 August 2019.

12.4 Organize the lecture on "Enhance the effectiveness in Human Resource" in 4 times which are:

- 1st During 2-3 May 2019 at Chiang Mai Orchid Hotel, Chiang Mai province
- 2nd During 23-24 May 2019 at Avani Khon Kaen Hotel and Convention Center, Khon Kaen Province
- 3rd During 20-21 June 2019 at Twin Lotus Hotel, Nakhon Si Thammarat province.
- 4th During 11-12 July 2019 at Ing Tarn Resort, Nakon Nayok province.

Human Resources Development of the Department of Highways



"Learn and Share to Goal"

The Department of Highways emphasized on human resource development and had been continuously developed the personnel for many years. That aimed to develop the personnel in every level to be ready for supporting the Department of Highways' missions. The human resource development of the Department of Highways starts from the beginning to the end of the government officers' working life so the development opportunity is distributed to every position and every career. The Training Division is responsible for developing human resource of the Department of Highways, so the training project implementation still follows the concept "Learn and Share to Goal" means the center of learning and sharing that aimed to encourage the officers to apply the acquired knowledge to achieve organizational goals. The direction and human resource development plan in 2019 were set from vision analysis, mission, value, strategy, personnel information, surveys necessary for human resource development which survey from the project monitoring and evaluation of the Training Division in 2019 by collaborating with the department head and representation of training participant.



The operation in human resources of the Department of Highways in the fiscal years 2019 are as follows;

1. Personnel promotion and development. The Department of Highways has promoted the learning of personnel in various forms. The training and developing was provided by human resource development plan which followed by the organization policy and urgent necessity as follows;

1.1 Human Resources Development by policies and strategies consists of the Executive Seminar of The Department of Highways and Thailand's 20-Year National Strategy, the training course that aimed to increase efficiencies for the new Director of Highway District, The training course for Project Engineer, The Orientation course for the new civil servants, batch 22. All of the training courses arrange every year to increase knowledge and encourage potential in core competencies of the job positions that relate to policy and the direction of the administration of the Department of Highways.

Moreover, the policy of the government is moving to the Digital Government. The Department of Highways has the project for encouraging the digital skills of personnel such as the training course "KnockDoor" for all IT staff in the Department of highways. The Keynote Lectures are about "The government officer have to catch up with disruptive technology" for the high-performance group.

1.2 Enhancing and developing in highway engineering aimed to continuously develop the officers. It also related to other missions of the Department of Highways. For example, the training course on Highway Engineering of the Department of Highways, batch 8, The Workshop on Road Safety Audit, During Construction and Pre-Opening Stage, Three on the job training course for a new civil engineer position, the training course on Highway safety for the executive and the highway maintenance staff, the seminar reinforces the capability in the highway depot management that aimed to develop the highway depot assistant by exchanged knowledge in the Communities of Practice of the Highway maintenance at the 1-18 Highway's Office in the fiscal year 2019. In the fiscal year 2019, the Department of Highways emphasized to transmit the experience and exchange technique to solve the problem in the highway depot management.

1.3 Enhancing and developing in administrative The Department of Highways is a large government organization which has various kinds of career including the main career in engineering and the supporting career. The personnel of the Department of Highways has to be improved the standard competency and others that support the vision and responsibility of the Department of Highways. So the Department of Highways has to provide the training course for developing personnel competency. There are the training course for the Beginner-level and Intermediate-level administrator of the Department of Highways, the training course on negotiation improving and conflict management for the Righ of Way staff, the training course reinforces the





capability of the government officer to prepare to be the Chief of general administration, the effective presentation skill training course, etc.

1.4 Encouraging knowledge in the organization The Department of Highways realizes the importance of the potential of personnel in the Department of Highways by using the knowledge and experience for developing the procedure and create the innovation leading to the goal of knowledge management. Now, the Department of Highways sets the method of knowledge encouraging and sharing knowledge through the Knowledge Management Project such as the seminar on knowledge management guidebook of the Department of Highways, the training course of the Facilitator: KM Camp, The Communities of Practice: CoPs on Government Procurement and Supplies Management, The project names "KM 4.0" for sharing knowledge about highway engineering and highway innovation which the Department of Highways arranges every year.

1.5 Enhancing Moral, Ethics and Quality of Life The Royal Coronation Ceremony of King Maha Vajiralongkorn was arranged in 2019 which was the auspicious year so the Department of Highways was arranged the training course about Thailand and the royal institution for Remembrance of the royal institution. This training course aimed to realize Thailand's history and use the knowledge as the guideline for work including to join the volunteer program according to the concept of His Majesty the King. Moreover, the Department of Highways has the Enhancing Moral, Ethics and Quality of Life training program at Wat Pa Tak Sila Ya Mo, Tumbon Khlong Phai, Sikhio District, Nakhon Ratchasima which arranges every year.

1.6 Enhancing Human Resource Development Cooperation For good service and increase the efficiencies of the Department of Highways' work, the Department of Highways



seeks for knowledge cooperation by requesting the Royal Thai government scholarship. The Department of Highways sent the officers to train with the other departments in various courses such as The Transportation Administrator Course, The 21st Intermediate Certificate Course in Good Governance for Middle-Level Executives, The 18th High Certificate Course in Public Affairs for High-Level Executives, The 19th High Certificate in Public Administration and Law and International courses by King Prajadhipok's Institute, etc.

Moreover, the Department of Highways has cooperation in academics with the ASEAN country for the international highway infrastructure developing benefit. The training course "The Third Country Training Program (TCTP)" was arranged two years in a row that following the memorandum of understanding between Japan International Cooperation Agency (JICA), Thailand International Cooperation Agency (TICA) and the Department of Highways (DOH).

2. Allocation of Scholarships

The Department of Highways provides opportunity for personnel who aimed to enhance personnel's knowledge. The scholarships were allocated to officers according to the professional necessity of the organization. In the fiscal year 2019, the amount of 6,536,000 baht of scholarships was allocated for the government officer in civil engineer and supporting career.

3. Content Review and enhance the Department of Highways Core Training Course

The Department of Highways emphasized performance development and course development so seven of the core training courses of the Department of Highways have improved. In the fiscal year 2019, the Core Training Course was arranged as follows;

1. On the job training course on Highway Engineering for the new civil engineer
2. The Highway Engineering Course
3. The Beginner-level Manager Course
4. The Intermediate-level Manager Course
5. The Training Course for Project Engineer
6. The Training Course for the new Director of Highway District
7. The Orientation Course for the new civil servants

The Training Division monitored and evaluated all of the Core Training Course in 2019 by interviewing the participants of the Core Training Course to improve the content and learning process. In 2020, The Training Division emphasizes to change the mindset of the personnel, integrate social skill, self-learning process, exchange the knowledge and experience by seminar or discussion or case study and create the innovation under the consultation of the expert.

4. Operating Results in Human resource development in the fiscal year 2019

There were 93 projects in human resource development with 18,658 participants and the total budget of 35,455,540 was spent as follows;

The human resource development project followed the human resource development plan

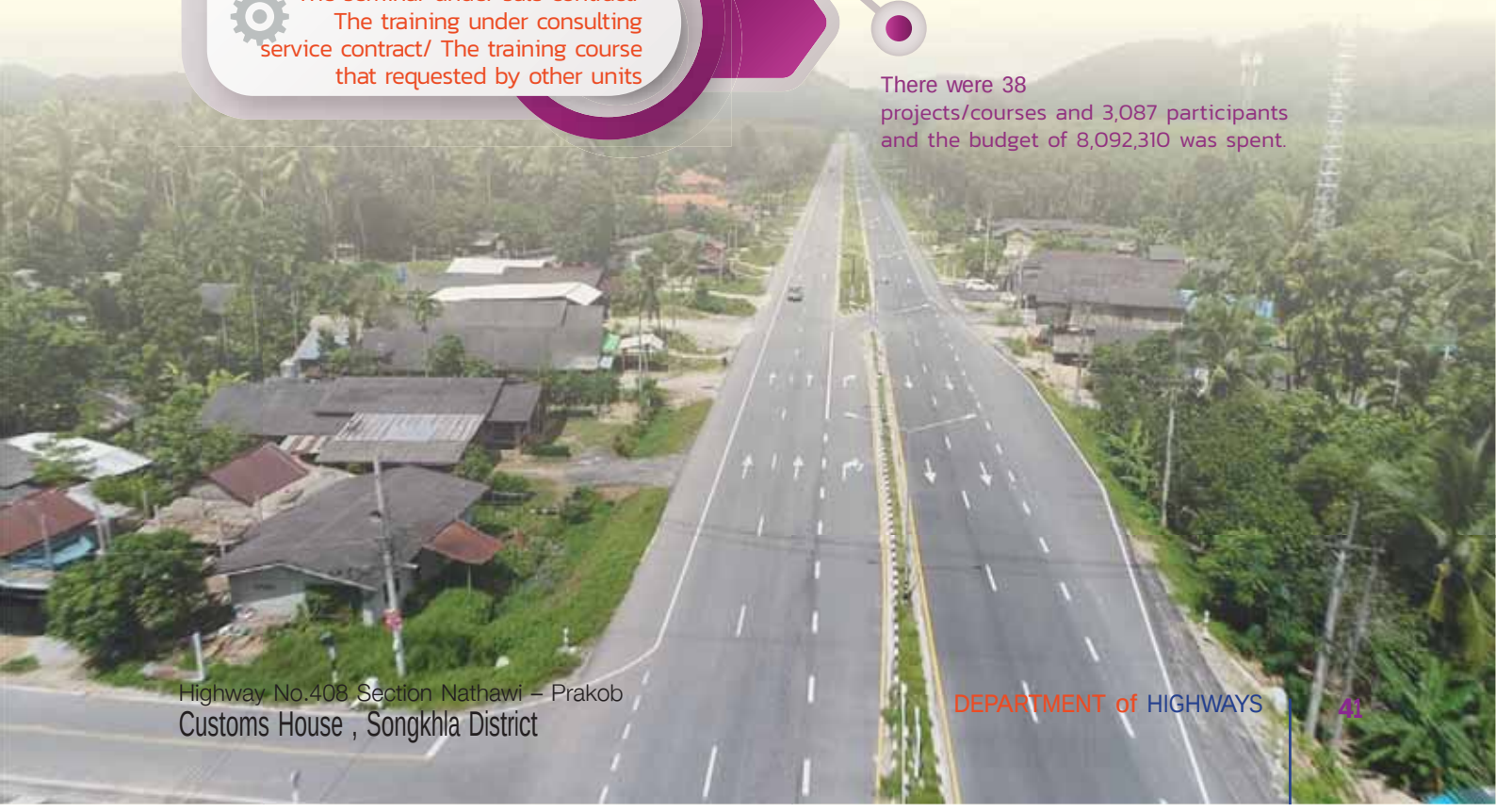
There were 20 projects/courses and 9,299 participants. The budget of 9,933,800 was spent.

The human resource development that not included in the human resource development plan

There were 38 projects/courses and 5,443 participants and the budget of 17,429,430 was spent

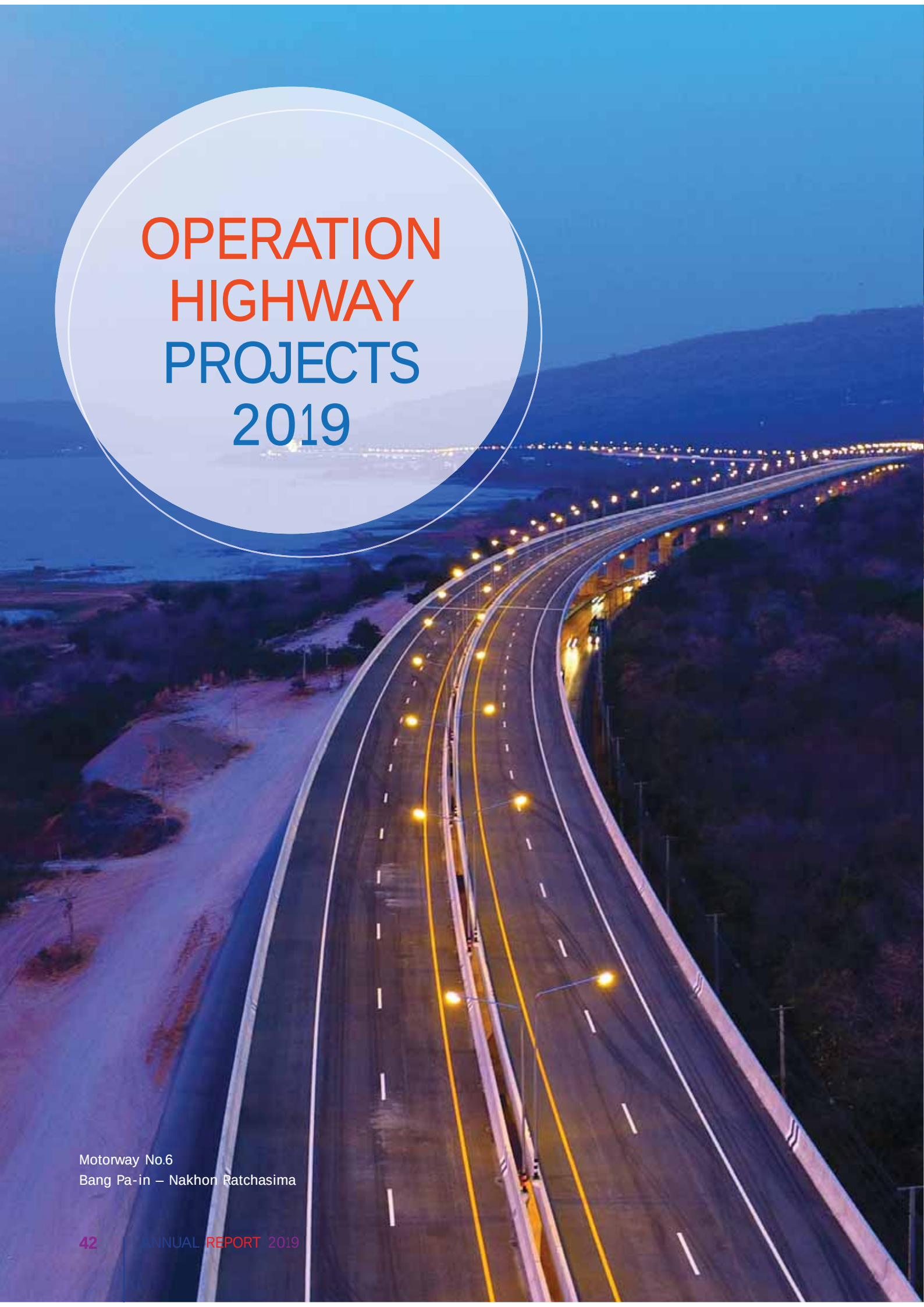
Training course/ The seminar under sale contract/ The training under consulting service contract/ The training course that requested by other units

There were 38 projects/courses and 3,087 participants and the budget of 8,092,310 was spent.



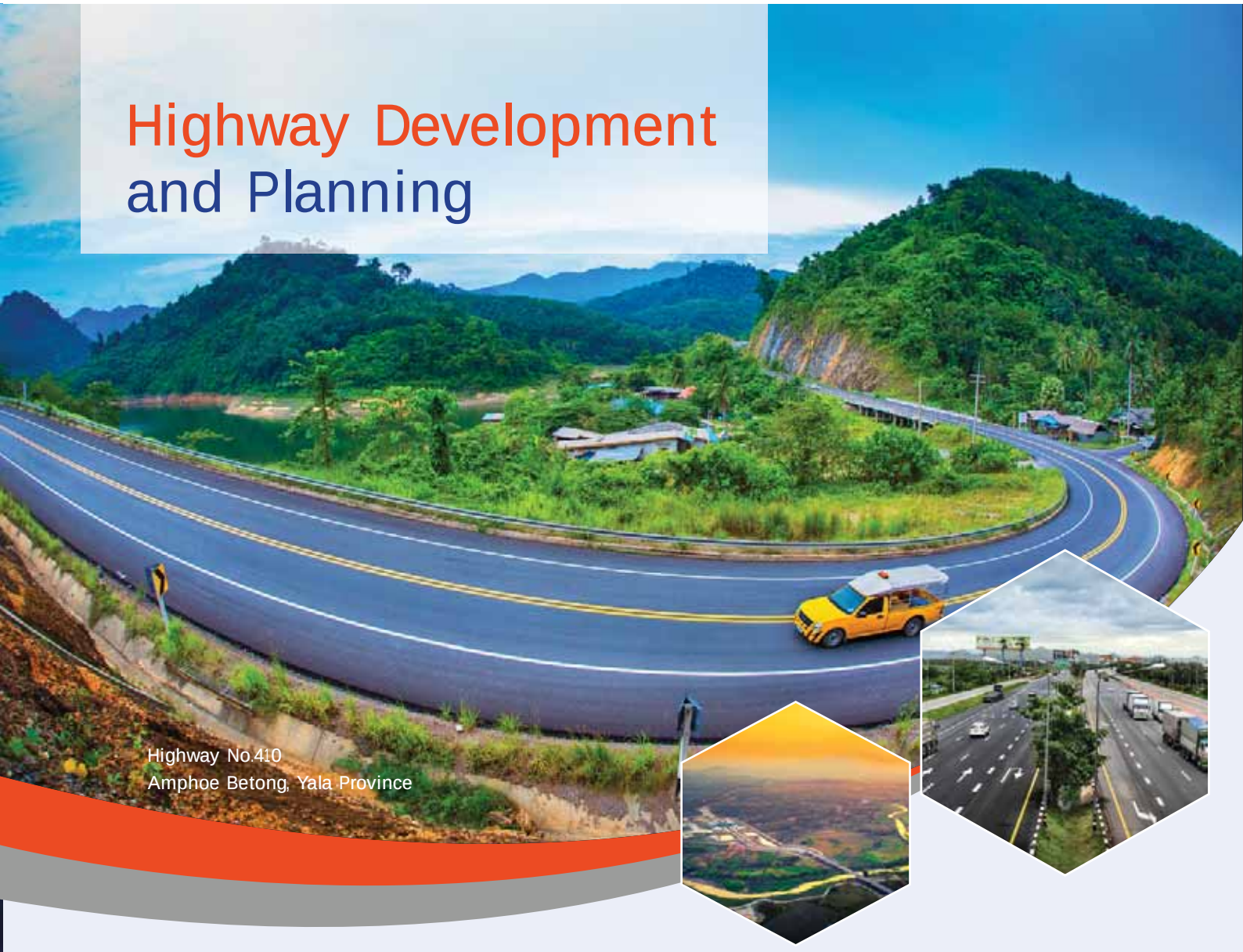
Highway No.408 Section Nathawi – Prakob
Customs House , Songkhla District

OPERATION HIGHWAY PROJECTS 2019



Motorway No.6
Bang Pa-in – Nakhon Ratchasima

Highway Development and Planning



Highway No.410
Amphoe Betong, Yala Province

Highway Planning is one of the crucial tasks of the Department of Highways (DOH). Highway Planning includes formulation and analysis of various transport strategies, policies, development directions, goals, and highway feasibility studies. The planning process includes short and long term strategies, which serve as a selective framework for project prioritization. The planning process also includes a strategic investment plan which is developed mostly from a project's feasibility studies, analyses of engineering and environmental impact, traffic demand analysis, budgeting allocation plan, e.g., loans, Public Private Partnership (PPP), and other sources of funds. Project planning is also used as a monitoring tool during project construction and as a post-evaluation measure after project completion, which could help planners realize the value as well as problems of project implementation.

In fiscal year B.E.2562 (2019), the DOH implemented the following highlighted activities associated with highway development planning:

1. The Public Private Partnership (PPP) for Operation and Maintenance of the Bang Pa In – Nakhon Ratchasima and Bang Yai – Kanchanaburi Motorways

Since the cabinet resolution on 14th July 2015 approved the construction of the Bang Pa In – Nakhon Ratchasima and Bang Yai – Kanchanaburi Motorway Projects, the DOH has persevered to keep the projects on schedule. At

present, the Bang Pa In – Nakhon Ratchasima Motorway Project's civil work and infrastructure are under construction and are set to be completed in 2022, while the Bang Yai – Kanchanaburi Motorway Project is currently in the process of land expropriation together with parallel civil work and infrastructure construction. The project is set to be complete in 2023.

To reduce the agency's budget and management burdens, on 8th March 2016 the cabinet gave the DOH approval to implement the Public-Private Partnership (PPP) for Operation and Maintenance (O&M) of the Bang Pa In – Nakhon Ratchasima and Bang Yai – Kanchanaburi Motorways, as well as for management of the motorway service areas and rest areas. The DOH evaluated and proposed the investment models and the project appraisal reports in accordance with the Private Investments in State Undertakings Act B.E. 2556 (2013), which were approved by the cabinet on 22nd August 2017. Upon the approval under the PPP O&M scheme, the private partner is to take responsibility for the design and construction of motorway facilities, while the DOH takes ownership of the facilities including toll revenue. The private party is to operate and maintain all the facilities of the project, including the civil work constructed by the DOH and the system work developed by the private party itself, over a maximum period of 30 years after the toll business operation begins. In turn, the DOH will remunerate the availability payment to the private party for its facility construction cost, operation and maintenance.

Currently the DOH is in negotiation with the successful bidder to formulate the draft PPP contract in accordance with the Private Investments in State Undertakings Act B.E.2556 (2013). The PPP contract is expected to be signed in 2020 in order to keep up with the operation schedule.

2. The study of Public Private Partnership (PPP) Schemes for Intercity Motorways

In order to meet the development timeline of the 20-year intercity motorway masterplan (2017-2036), the DOH has prepared to implement the PPP scheme for high priority motorway routes under the urgent PPP Strategic Plan (2017 – 2021). The projects details are as follow:

2.1 The PPP Project of the intercity motorway: Hat Yai – Thailand/Malaysia Border

The intercity motorway, Hat Yai – Thailand/Malaysia Border, aims to serve as a primary transportation and logistics network connecting Hat Yai District to the Thailand/Malaysia border in Sadao District, one of Thailand's important Special Economic Zones (SEZ), in which Pa-dang Besa customs and Sadao customs are located. These customs accounted for the highest value of all Thailand's border trade. The project will create a faster, safer, and more convenient route between Hat Yai business areas and the Thailand/Malaysia border in order to support international trade and enhance Thailand's investment, employment, and competitiveness. The motorway is designed to be a four-lane highway with fully controlled access. It will be approximately 70 kilometers long. In terms of progress, the PPP feasibility study of the motorway has been completed.

2.2 The PPP Project of motorway link: the elevated road above the national highway No.35, Bang Khun Tian – Pak Toa, Bang Khun Tian – Ban Phaeo Section

The Bang Khun Thian – Pak Tho Intercity Motorway, Bang Khun Thian – Ban Phaeo section, aims to serve as a main road connecting the central area of Bangkok to the Southern region of Thailand, as well as to alleviate traffic congestion due to high travel demands especially on Bangkok's outer ring road to Samut Sakhon District (Mahachai) road section. The project is designed to be a six-lane elevated toll road on Highway No.35 (Rama II: Bang Khun Thian – Ban Phaeo section). The project begins at Bang Khun Thian, connecting to the EXAT's Rama III – Dao Khanong – Western Bangkok Outer Ring Expressway at the Bang Khun Thian Toll Plaza and ends before Ban Paew Intersection. The project will have an approximate total length of 25 kilometers. The project is currently under the PPP feasibility study.

3. Four-Lane National Highway Extension, Phase 2

After the completion of the four-lane National Highway Extension Phase 1 in 1996, the cabinet approved the DOH to continue with the second phase of the four-lane national highway extension projects. The action plan covers 11 routes of the DOH's highway network with a total length of 5,247 kilometers. The 11 highways that have been developed to connect different provinces and regions throughout the country are as follows:

Network 1: Nakhon Sawan – Phitsanulok – Denchai – Phrae – Ngao

Network 2: Mae Sot – Tak – Sukhothai – Phitsanulok – Lom Sak - Chum Phae - Khon Kaen – Kalasin – Mukdahan

Network 3: Saraburi – Phetchabun – Lom Sak - Loei

Network 4: Ban Hin Kong - Nakhon Nayok - Prachin Buri – Aranyaprathet – Thai/Cambodia Border

Network 5: Nakhon Pathom - Suphan Buri – Pa Mok – Saraburi

Network 6: Nakhon Sawan – Chaiyaphum – Ban Phai - Maha Sarakham - Roi Et – Yasothon - Ubon Ratchathani - Chong Meg

Network 7: Sattahip - Phanom Sarakham - Kabin Buri - Pak Thong Chai – Nangrong – Prasat - Ubon Ratchathani - Mukdahan

Network 8: Surat Thani - Nakhon Si Thammarat - Songkhla - Hat Yai

Network 9: Phuket – Phangnga – Krabi – Trang - Phatthalung

Network 10: Loei – Udon Thani - Sakon Nakhon - Nakhon Phanom

Network 11: Other routes, including Link: Saklek – Wangthong, Sukhothai – Sawankalok, Sikhio – Chaiyaphum, Kaeng khro - Chum Phae, Chumphon – Ranong, Surat Thani - Phangnga



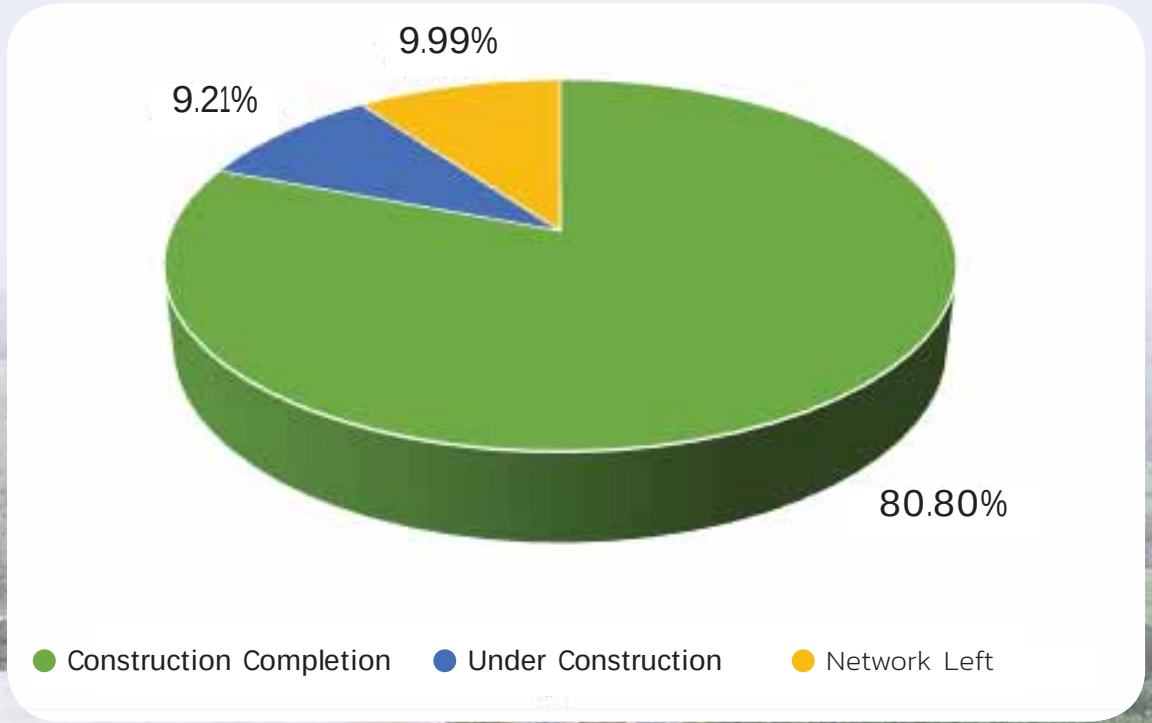
Highway No.101 Amphoe Rong Kwang – Nan, Section Ban Pha Mu – Ban Pang Khao

The current status of the projects is as follows:

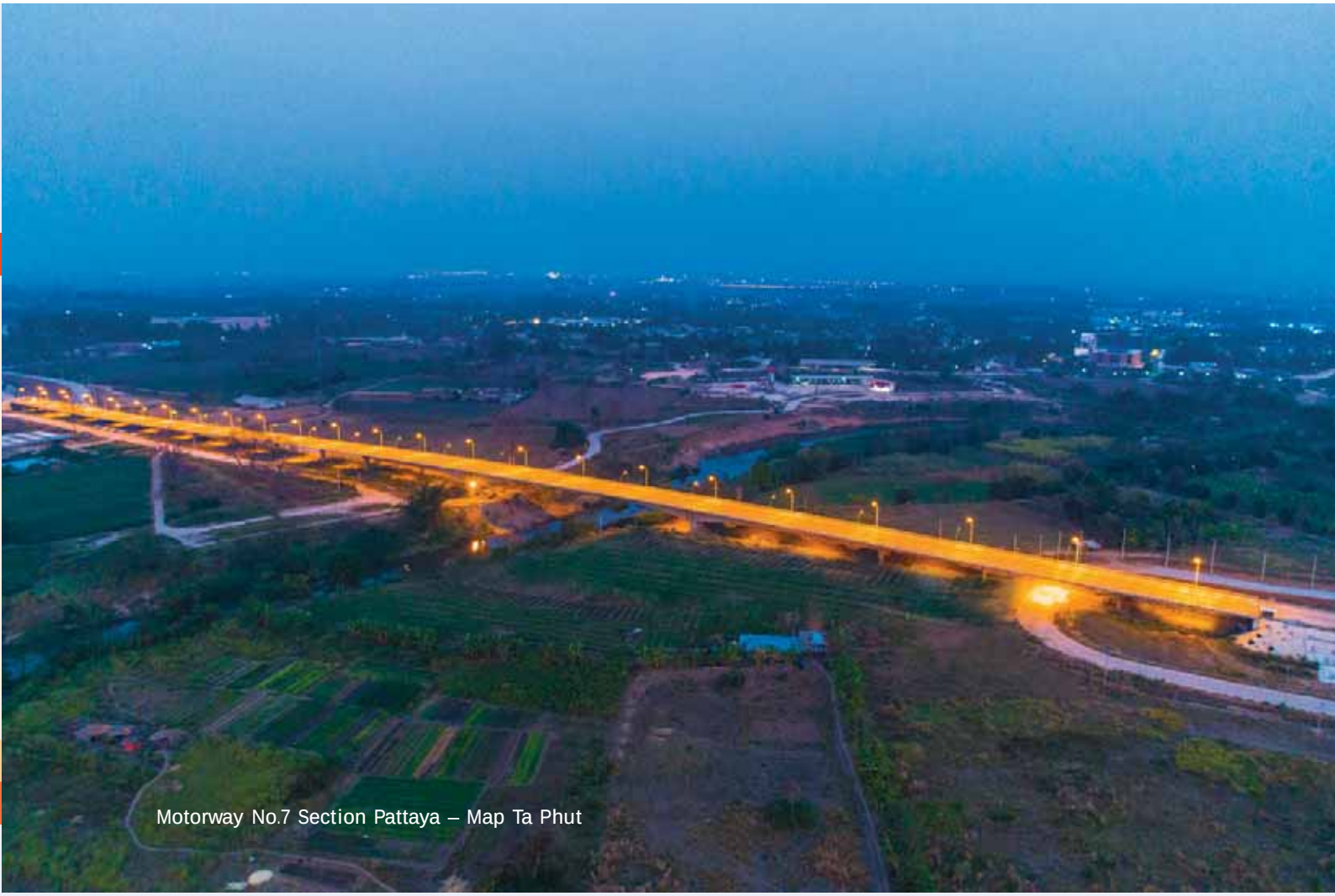
Unit: Distance (Kilometer)

Network	Complete Construction	Under Construction	To be Constructed	Total
1	513.12	30.50	20.00	563.61
2	689.60	62.76	80.73	833.09
3	276.32	-	115.72	392.04
4	167.15	28.85	-	196.00
5	194.61	34.63	-	229.24
6	323.25	64.48	256.18	643.90
7	828.25	89.11	-	917.36
8	343.16	-	-	343.16
9	386.74	-	-	386.74
10	216.48	101.43	-	317.91
11	300.44	71.58	51.38	423.40
Total	4,239.10	483.33	524.01	5,246.44
percentage	80.80	9.21	9.99	100.00

Status: October, 2019



Klaeng Bypass Road, Rayong Province



Motorway No.7 Section Pattaya – Map Ta Phut

4. The Highway development projects to support Special Economic Zones (SEZ):

According to the announcement of the Special Economic Zone Development Board No.1/2015 and 2/2015, ten special economic areas have been developed to promote a production base that will link with the ASEAN region. The policy goals are to promote new economic areas for trading and investment with neighbouring countries, reducing social and income inequality, raising the people's quality of life, and solving security problems in the cross border area.

The DOH therefore proposed development plans for 49 highway projects to support the economic growth of the areas during 2014 to 2024. As of now, 22 projects have been completely constructed, 15 projects are under construction, and the remaining projects are in preparation.

The Highway Development Projects to Support the Eastern Economic Corridor (EEC):

The Eastern Economic Corridor (EEC) is a spatial development strategy, with the purpose of continuing the success of the Eastern Seaboard Development. The main goal is to support regional investment to raise the industrial standard, increase competitive ability, and help the country's economy to grow in the long run. Currently the Eastern Special Development Zone Act, 2018, has been issued, covering 3 provinces: Chon Buri, Rayong and Chachoengsao.

The DOH therefore plans to develop 63 highway infrastructure projects to support the development during 2014 to 2020. As of now, 14 projects have been completed, 26 projects are under construction, and 23 projects are in the upcoming plan

6. The Annual Budget Planning

For each year the DOH has to propose budgetary planning for highway development projects to the Bureau of the Budget (BB). In 2019 the DOH submitted the following project list under Thailand's Transportation Infrastructure Strategic Plan to the BB:

6.1 Major Highway Construction Projects

These large construction projects have followed the highway development master plan, with respect to national development strategies. In fiscal year 2019 the DOH has been allocated budgets for 70 new construction projects, which consist of:

No.	Plan/Project/Output/Activity	Amount (Projects)	Construction Cost (M. THB)	Budget received in 2019 (M. THB)
1	National highway development in the special economic zones and borders	6	5,800	1,160
2	National highway development for the Eastern Economic Corridor	13	13,570	2,714
3	Primary highway rehabilitation for regional connectivity improvement	4	1,960	392
4	Railroad crossing bridges	4	1,170	234
5	The national highway development	38	32,220	6,444
	5.1 National highway construction	19	14,830	2,966
	5.2 Interchanges, bridges and tunnels construction	6	2,530	506
	5.3 Bangkok and suburban traffic congestion improvement	6	9,680	1,936
	5.4 Construction of four-lane national highway extension projects (Phase 2)	5	3,660	732
	5.5 Highway development for multimodal transportation	2	1,520	304
6	International highways construction	4	5,130	1,026
7	The extension of the Borommaratchachonnani Road			
8	The elevated toll road on Highway No.35: Bang Khun Thian – Pak Tho section (Rama II)	1	10,500	2,100
Total		70	70,350	14,070

6.2 Minor Highway Improvement Projects

In addition to the major highway construction projects noted above, minor improvement and construction projects will be completed in a short period (less than one year) and require less budget. These projects are to remedy and alleviate highway deterioration in local areas as well as congestion problems in community areas across the country. The following are activity/project types under the Minor Highway Improvement Projects that aim to serve local demands and solve transportation problems in local communities:

1. Highway Improvement for Community Area
2. Construction and Improvement of Bridge and Tunnel
3. Minor Highway Improvement or Highway Efficiency Improvement
4. Regional Development Integration Plan

The above activities/projects are in line with national and regional development strategies. Specifically, the projects under the Regional Development Integration Plan are also accounted for in other agencies' development plans from both the private and government. The budgeting details for 2019 are as follows:

No.	Activity/Project	Total Amount	
		Projects	Budget Received (M. THB)
1	Highway Improvement for Community Area	46	965.00
2	Construction and Improvement of Bridge and Tunnel	52	373.87
3	Minor Highway Improvement or Highway Efficiency Improvement	59	1,500.00
4	Regional Development Integration Plan	58	1,934.00
Total		215	4,772.87



International Highways Development



Motorway No.6
Bang Pa-in – Nakhon Ratchasima

1. The Significance of International Highway Cooperation Framework

International highway cooperation framework, as a part of transport cooperation framework, is an important tool to activate the economic and social integration between nations. The fostering of this cooperation will influence Thailand's ability to efficiently compete and encounter with the globalization.

2. The International Cooperation involved with the Department of Highways

Thailand has emphasized to promote the connection of transportation, especially road connections, and the Department of Highways has played an important role in developing roads and bridges to connect the transportation routes between neighboring countries and countries within the region thoroughly and safely. The Department of Highways has been engaged with many international highways cooperation frameworks for instance, multilateral cooperation frameworks such as UNESCAP, ASEAN, GMS, and IMT-GT, and bilateral cooperation frameworks with neighboring countries such as Cambodia, Lao PDR, Myanmar, and Malaysia. The following are background and overall achievement under the international cooperation frameworks:

2.1 UNESCAP – The United Nations Economic and Social Commission for Asia and the Pacific

There are 53 member countries in UNESCAP included 49 countries in Asia and the Pacific, including Thailand, and four countries outside the region which are France, Netherlands, United Kingdom, and United States of America.

The project that involves with UNESCAP is Asian Highway Network. This project contributes the increasing needs of international transportation. Moreover, the Asian Highway Network connects ASEAN sub-region together by crossing 32 countries and the total distance of the route is 141,105 kilometers.



Asian Highway Route Map

There are nine routes of Asian Highway in Thailand and the total distance is 5,540 kilometers. The details of the routes are as follows:

No.	Details
AH1	Ban Khlong Luek (Thailand and Cambodia Border) - Aranyaprathet - Sa Kaeo - Kabin Buri - Prachinburi - Nakhon Nayok - Hin Kong - Bangkok - Ang Thong - Singburi - Chainat - Nakhon Sawan - Kamphaeng Phet - Tak - Mae Sot (Thailand and Myanmar Border)
AH2	Sadao (Thailand and Malaysia Border) - Ban Khlong Ngae - Ban Kho Hong - Ban Koo Ha - Phatthalung - Amphoe Tung Song - Amphoe Waeng Sa - Amphoe Chaiya - Amphoe Lamae - Chumphon - Amphoe Tha Sae - Amphoe Bang Saphan Noi - Prachup Khirikan - Amphoe Pran Buri - Amphoe Cha-am - Phetchaburi - Amphoe Pak Tho - Nakhon Pathom - Bangkok - Amphoe Bang Pa-in - Tak - Amphoe Thoen - Lampang - Amphoe Ngao - Phayao - Chiang Rai - Mae Sai (Thailand and Myanmar Border)
AH3	Amphoe Chiang Khong (Thailand and Lao PDR Border) - Ban Tha Thalat - Ban Hua Doi - Chiang Rai
AH12	The 1st Thailand - Lao PDR Friendship Bridge - Nongkhai - Udonthani - Amphoe Namphong - Khonkaen - Amphoe Ban Phai - Amphoe Phon - Nakhon Ratchasima - Amphoe Sikhio - Amphoe Muak Lek - Saraburi - Hin Kong
AH13	Huai Kon (Thailand and Lao PDR Border) - Nan - Phrae - Den Chai - Uttaradit - Phitsanulok - Sam-ngam - Nakhon Sawan
AH15	Nakhon Phanom (Thailand and Lao PDR Border) - Ban That Na Waeng (Sakon Nakhon) - Amphoe Phang Khon - Amphoe Sawang Daen Din - Udonthani
AH16	Mukdahan (Thailand and Lao PDR Border) - Amphoe Nong Sung - Amphoe Somdet - Kalasin - Yang Talat - Khonkaen - Amphoe Nam Nao - Amphoe Lom Sak - Ban Yang - Amphoe Wangthong - Phitsanulok - Sukhothai - Tak
AH18	Amphoe Su-ngai Kolok (Thailand and Malaysia Border) - Amphoe Tak Bai - Narathiwat - Amphoe Saiburi - Amphoe Pha Lat - Pattani - Amphoe Nong Chik - Amphoe Thepha - Amphoe Chana - Amphoe Hat Yai
AH19	Amphoe Pak Thong Chai - Amphoe Kabin Buri - Amphoe Plaeng Yao - Laemchabang Port - Chonburi - Bangkok



Asia Highway Network in Thailand

2.2 ASEAN-Association of Southeast Asian Nations

ASEAN-Association of Southeast Asian Nations consists of ten member countries namely Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

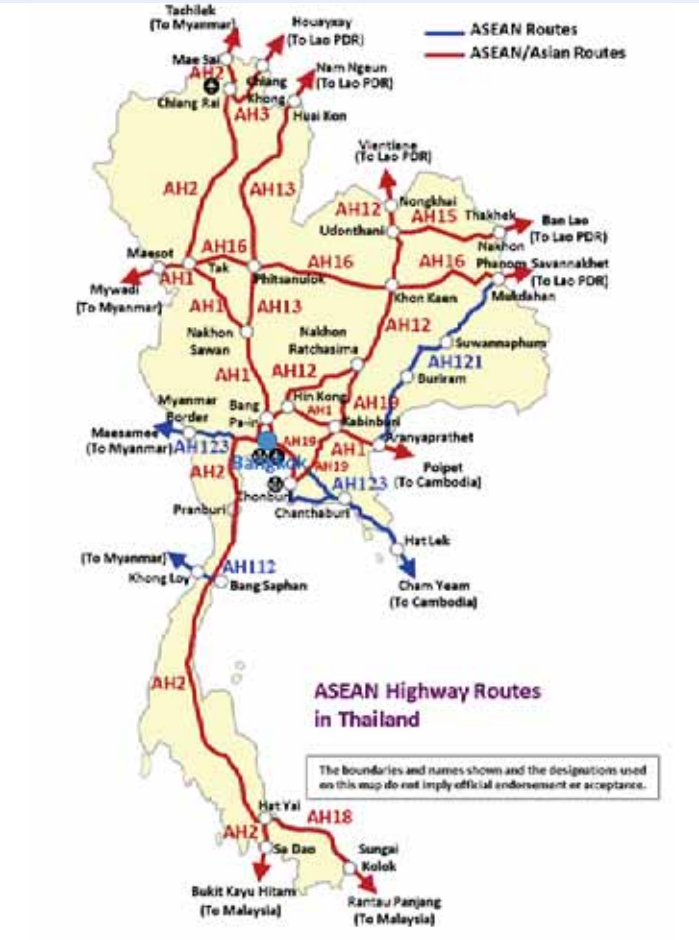
Highway cooperation project that involve with ASEAN is ASEAN Highway Network. The ASEAN Highway Network is supporting connections within ASEAN and also connections between ASEAN with other regions. The main purpose of this project is to link the travel routes and connections in ASEAN Member States. In addition, it is an opportunity to accelerate economic growth and enhancing region's trade, investment, as well as promoting tourism within the region. The ASEAN highway network cuts through ten countries, totaling 23 routes with total distance of 37,000 kilometers.



ASEAN Highway Network

There are 12 routes of ASEAN Highway Network in Thailand and the total distance is 6,731.5 kilometers. The details of the routes are as follows:

No.	Details
AH1	Ban Khlong Luek (Thailand and Cambodia Border) - Aranyaprathet - Sa Kaeo - Kabin Buri - Prachinburi - Nakhon Nayok - Hin Kong - Bangkok - Ang Thong - Singburi - Chainat - Nakhon Sawan - Kamphaeng Phet - Tak - Mae Sot (Thailand and Myanmar Border)
AH2	Sadao (Thailand and Malaysia Border) - Ban Khlong Ngae - Ban Kho Hong - Ban Koo Ha - Phatthalung - Amphoe Tung Song - Amphoe Waeng Sa - Amphoe Chaiya - Amphoe Lamae - Chumphon - Amphoe Tha Sae - Amphoe Bang Saphan Noi - Prachup Khirikan - Amphoe Pran Buri - Amphoe Cha-am - Phetchaburi - Amphoe Pak Tho - Nakhon Pathom - Bangkok - Amphoe Bang Pa-in - Tak - Amphoe Thoen - Lampang - Amphoe Ngao - Phayao - Chiang Rai - Mae Sai (Thailand and Myanmar Border)
AH3	Amphoe Chiang Khong (Thailand and Lao PDR Border) - Ban Tha Thalat - Ban Hua Doi - Chiang Rai
AH12	The 1st Thailand - Lao PDR Friendship Bridge - Nongkhai - Udonthani - Amphoe Namphong - Khonkaen - Amphoe Ban Phai - Amphoe Phon - Nakhon Ratchasima - Amphoe Sikhio - Amphoe Muak Lek - Saraburi - Hin Kong
AH13	Huai Kon (Thailand and Lao PDR Border) - Nan - Phrae - Den Chai - Uttaradit - Phitsanulok - Sam-ngam - Nakhon Sawan
AH15	Nakhon Phanom (Thailand and Lao PDR Border) - Ban That Na Waeng (Sakon Nakhon) - Amphoe Phang Khon - Amphoe Sawang Daen Din - Udonthani
AH16	Mukdahan (Thailand and Lao PDR Border) - Amphoe Nong Sung - Amphoe Somdet - Kalasin - Yang Talat - Khonkaen - Amphoe Nam Nao - Amphoe Lom Sak - Ban Yang - Amphoe Wangthong - Phitsanulok - Sukhothai - Tak
AH18	Amphoe Su-ngai Kolok (Thailand and Malaysia Border) - Amphoe Tak Bai - Narathiwat - Amphoe Saiburi - Amphoe Pha Lat - Pattani - Amphoe Nong Chik - Amphoe Thepha - Amphoe Chana - Amphoe Hat Yai
AH19	Amphoe Pak Thong Chai - Amphoe Kabin Buri - Amphoe Plaeng Yao - Laemchabang Port - Chonburi - Bangkok
AH112	Amphoe Khlong Loy - Amphoe Bang Saphan
AH121	Mukdahan - Amnat Charoen - Yasothon - Amphoe Suwannaphum - Amphoe Phayakkhaphum Phisai - Buriram - Nang Rong - Ban Som Poi - Ban Chong Ta Kho - Sa Kaeo
AH123	Ban Bo Nam Phu Ron (Thailand and Myanmar Border) - Kanchanaburi - Nakhon Pathom - Bangkok - Samutprakan - Chonburi - Laemchabang Port - Map Ta Phut Industrial Estate - Rayong - Amphoe Klaeng - Chanthaburi - Trat - Amphoe Hat Lek



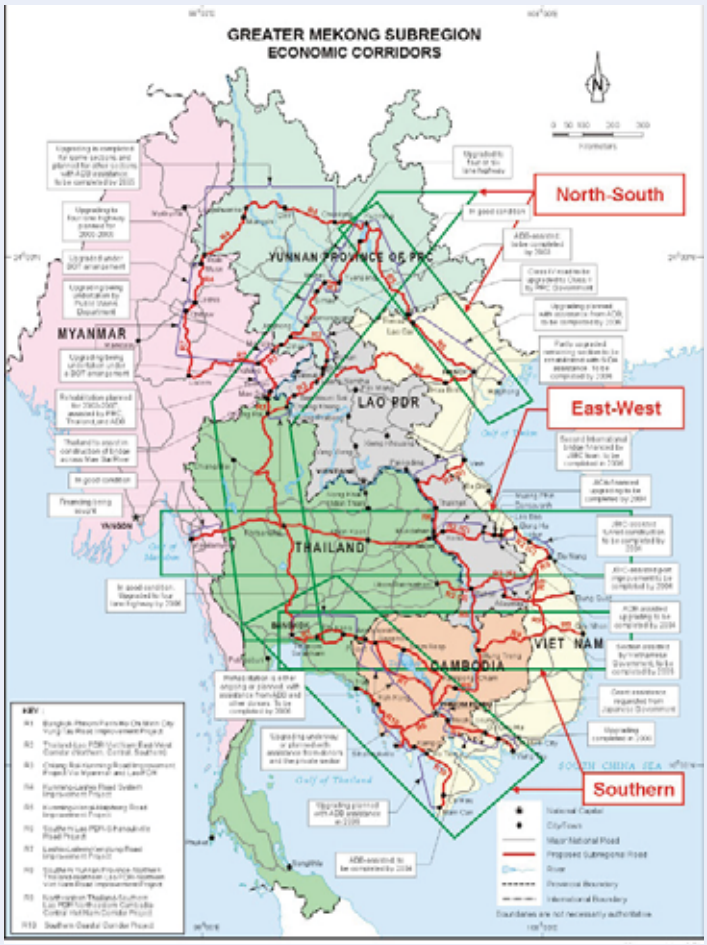
ASEAN Highway Network in Thailand

The Department of Highways has been given major associations in the development of ASEAN Highway since 1997 until present. The important mission is the establishment of ASEAN Highway Network, the execution of road design standards, and the setup of traffic sign design standard. At present, the roads in Thailand under the ASEAN Highway Network have been developed as Special Class standard and Class I standard for more than 80 percent and ASEAN Highway signs have been installed in all routes

2.3 GMS - Greater Mekong Subregion

Greater Mekong Subregion (GMS) has six member countries which are located in the Mekong River Basin [Thailand, Lao PDR, Cambodia, Vietnam, Myanmar, and Yunna and Guangxi (Southern China)] and are supported by Asian Development Bank - ADB.

Highway cooperation project that related to GMS is Economic Corridor. The project is for promoting the growing of industrial economic and investment, agricultural and service investment, also to support the employment and enhancing the well-being of regional people. The development is focused on economic development along the corridors, which is a potential area, in order to achieve financial, economic, and environmental sustainability. The economic corridors categorized into three main corridors and covered six countries. For Thailand, there are three significant corridors and other corridors for instance, North South Economic Corridor: NSEC, East West Economic Corridor: EWEC, Southern Economic Corridor: SEC, and Others Corridors / Routes/Border Crossings.



GMS Economic Corridors

2.4 IMT-GT -Indonesia-Malaysia-Thailand Growth Triangle

IMT-GT consists of three member countries and covers all the three countries as follows;

- 14 provinces in the Southern Thailand

- 10 provinces in Indonesia: Aceh, North Sumatra, West Sumatra, South Sumatra, Riau, Riau Islands, Jambi, Bengkulu, Bangkal-Belitung, and Lampung

- Eight States in Malaysia: Penang, Kedah, Perak, Perlis, Kelantan, Selangor, Melaka, and Negerisembilan

Currently, IMT-GT is implementing in accordance with IMT-GT VISION 2036. There is an important five-year plan (year 2017-2021), namely the IMT-GT Implementation Blueprint (IB) 2017-2021. The IB 2017-2021 has a plan to develop Physical Connectivity Projects (PCP). IMT-GT that the Department of Highway associates with is as follows:

- Hatyai - Sadao Intercity Motorway Project

- The Bridge Crossing the Golok River between Tak Bai, Narathiwat and Pengkalan Kubur, Kalantan Project or Tak Bai Bridge

- The 2nd Bridge Crossing the Golok River between Su-ngai Kolok, Narathiwat and Rantau Panjang, Kalantan Project or The 2nd Golok Bridge

2.5 Bilateral Cooperation with Neighboring Countries

In year 2019, the Department of Highways has been accordingly processed important cooperation with neighboring countries:

- The 2nd Friendship Bridge Crossing Moei/ Thaungyin River was officially inaugurated on October 30, 2019

- The Thailand-Cambodia Friendship Bridge (Ban Nong Ian-Stung Bot) was marked the completion of the Bridge on April 22, 2019

- The 5th Thai-Lao Friendship Bridge (Bueng Kan-Bolikhamxai) is in the process of preparation for construction

Highway Survey and Design



> *"Highway survey and design is the main mission of Department of Highways in operating highway survey and design"*

Highway survey and design is the main mission of Department of Highways in operating highway survey and design, bridge structure design, drainage system design including plays an important role in studying and setting the standard in highways and other structure design according to engineering principles for either internal units and other organizations to apply in their design and be convenient in examining the estimated construction costs in the same standard.

Due to mission of Department of Highways, the department has to work according to highway development plan. This plan is specified following the direction of transportation system development of National Economic and Social Development Plan and Department of highways has to achieve the specified plan. The work according to the plan covers investment budget projects on highways construction and maintenance throughout the country as inter-city motorway construction, highway standard expansion to 4 lanes or more, pavement maintenance and improvement, new highway construction, interchange and flyover construction as well as highway safety service.

Department of Highways is the responsible unit for preparing projects in accordance with the plan. In fiscal year 2019, Department of Highways has survey and design 109 bridge projects. They can be classified as route and bridges survey including survey and design project, international highways such as The 5th Thai – Lao Friendship Bridge Project (Buengkan – Bolikumsai) bypass Muang Buengkan section 1 and 2

Moreover, there are public hearings in highway survey and design projects as follows;

- Highway no.3 route Amphoe Sattahip – Amphoe Baanchang Construction and Traffic Solution Project

- Highway no.317 route Chantaburi – Srakaew section Amphoe Pongnumron – Amphoe Soidao Construction Project

- Highway no.118 section Amphoe Maesarauy – intersection of highway no.1 between km.141+000 and km.158+473 survey and design 4-lane highway Project

- Highway no.4 section Khaolak – Lumkan 4-lane highway survey and design Project

- Highway no.3, km.153+200 to km. 175+442 (Pattaya – Amphoe Sattahip) construction Project

- Jomthong Bypass 4-lanes highway survey and design Project

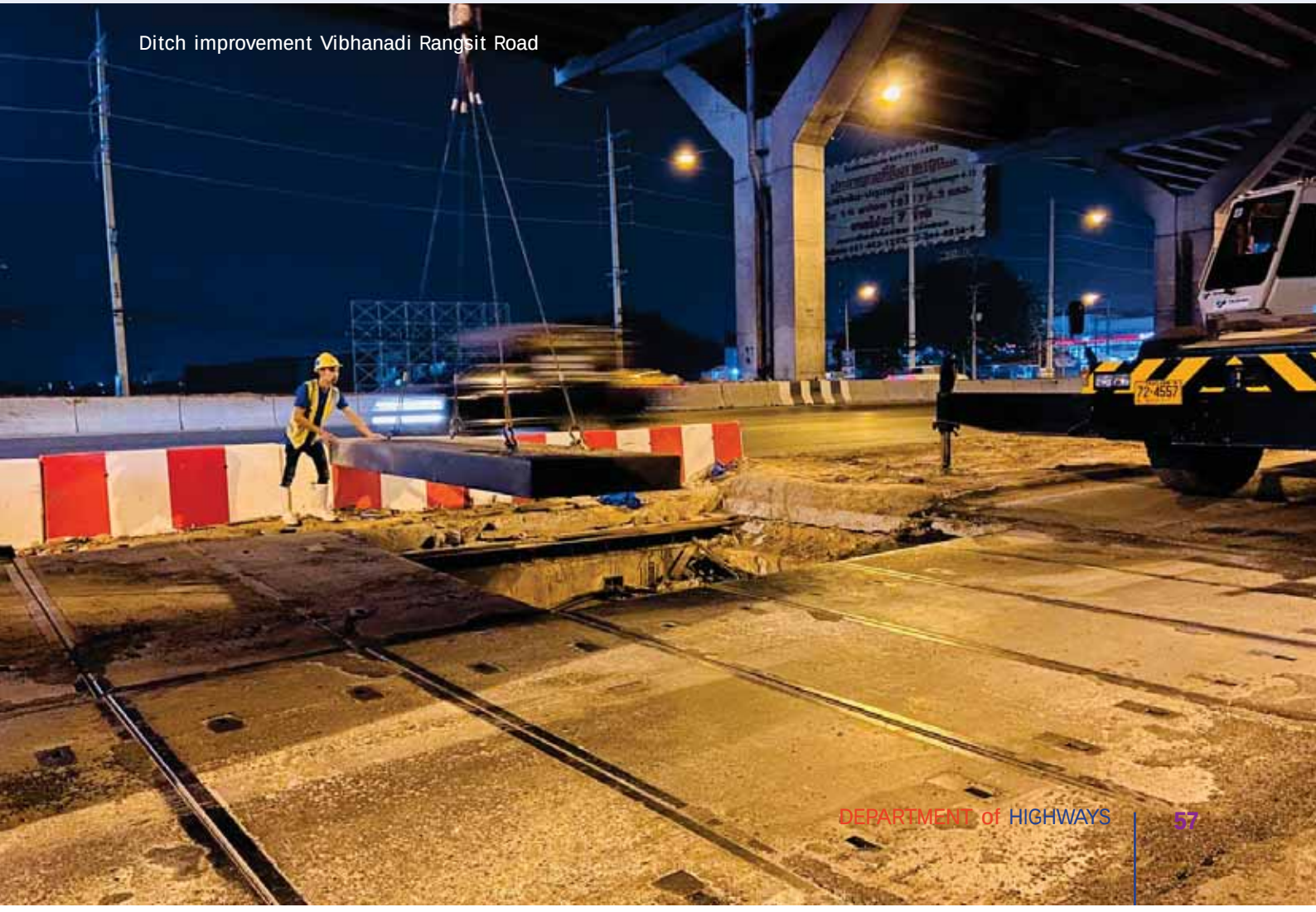
- Highway no.34 section Motorway no.9 intersect bypass Chonburi (part 2) Construction and Traffic Solution Project

- Highway no.332 section highway no.3 intersection (Yakjae) – Highway No.3 (Yak U-Tapao) km.0+000 – km.14+487 Construction Project

- The 3rd Seminar of Project on highway survey and design on Motorway no.9 (west) section Bang Bau Thong - Bang Pa-in Construction Project

- etc.

Furthermore, there are other missions as the explanation upon requests such as appeal on the underpass of highway no.6 route Bang Pa-in – Nakhon Ratchasima km.29 (section 6) Project. Encouraging people to understand the implementation of the department as participate in the seminar on "Petchaburi's Future and the south motorway". And speak to the media in order to build the knowledge and understanding on inter-city motorway no.8 route Nakonpatom - Cha-am Project.



Ditch improvement Vibhanadi Rangsit Road

Land Acquisition



Location Survey for Mapping to Show the Detail of Immovable Asset And to Estimate the Cost for Setting the Compensation of Expropriation of Concession Highway No. 8; Nakhon Pathom – Cha-am

Background

The Concession Highway No. 8; Nakhon Pathom – Cha-am is a highway that is important in urgent project of the master plan of inter-city motorway development which the Cabinet approved on 22 April 1997. The starting point of the project connected to

inter-city motorway project; Bang Yai – Kanchanaburi; at Amphoe Nakhon Chai Si, Nakhon Pathom Province and ending at Amphoe Tha Yang, Phetchaburi Province. It connected to inter-city motorway project; Cha-am – Chumphon which is the next section of inter-city motorway project; Nakhon Pathom – Cha-am. The objectives of the project are to share traffic volume from Highway No. 4 (Phet Kasem Road) which is the main road to go to Southern of Thailand for more convenient, rapid and safe and can save time and travel expense, to support Thailand to be the center of logistics and transportation in South-East Asia region, to support the employment and to encourage the investment and support the expansion of economy, social and tourism in strategic area of Southern part.

Concession Highway No. 8; Nakhon Pathom – Cha-am is 109 kilometers. It is a part of inter-city motorway from Nakhon Pathom to Narathiwat (Su-ngai Kolok checkpoint) which has 3 section with 1,068 kilometers. Concession Highway No. 8; Nakhon Pathom – Cha-am is a route connected Bangkok and center of Southern part. Moreover, it expands development to the region and it conforms to several development plans of the South. It also showed that Concession Highway No. 8; Nakhon Pathom – Cha-am should be developed for solving the traffic problem in related route and it is the connection with all 13 routes in inter-city motorway network. It can develop economy, society, and way of life of Southern.

This project is urgent project which has to expropriate the land and pay for the compensation for making the construction smooth. It has to use many staffs to survey and estimate the asset cost and there are many projects which should be expropriated. Hence, it is necessary to hire the consultants to study details of immovable asset and estimate the cost of compensation and they also have high technology equipment for making the project accomplish as the objectives.

Process

The consultants should survey and make a map showing the detail of immovable assets and estimate the cost for setting the compensation of expropriation in right of way. The process of work is as follows:

Part 1; survey and mapping to show details of landscape in right of way and expropriation line as construction map by positioning plane control traverse marks linked with universal transverse mercator of the Department of Lands and plane traversing in center of roadway. There is mapping to show the lands which were expropriated of all right of way and the layout to show buildings and trees which were expropriated.

Part 2; survey and cost estimation of lands which were expropriated and the rest under Expropriation of Immovable Property Act, B.E. 2530 by creating details and cost estimation of each plot of expropriated areas and the rest under Expropriation of Immovable Property Act, B.E. 2530 and academic principle of cost estimation. It should be considered about the location, size and shape of land, land use, and public utility and public assistant, regulation and order of Department of Highways including related laws by study, analysis, and research for clear information and can be examined by reference, educational documents, analysis and research.

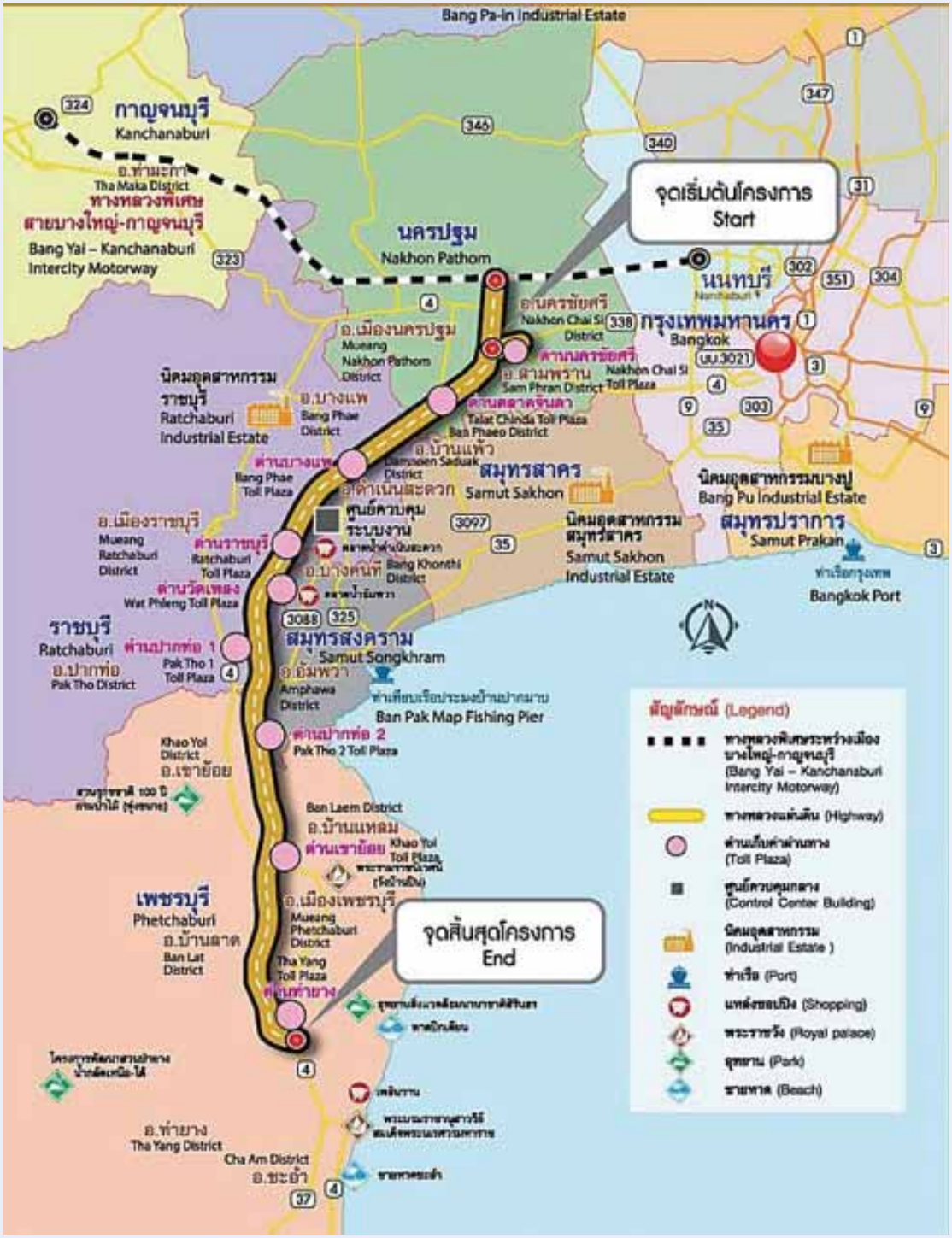
Part 3; examination of document of right and right investigation for acknowledging the people who have right to receive the compensation. Consultants have examined and copied the title deed and abstract of title from the start until now, examined and copied domicil of civil registration from the Bureau of Registration Administration. Then, the consultants investigated the right for acknowledging the status of possession or utilization together with document of right and made namelist and domicil of civil registration.

Part 4; Making details and estimating initial cost of compensation of buildings with fruit trees and other rights under law which must pay the compensation. The consultants made details of initial survey of assets and estimated initial cost of compensation of buildings with fruit trees under criteria of estimation, regulations and orders of Department of Highways together with photograph.

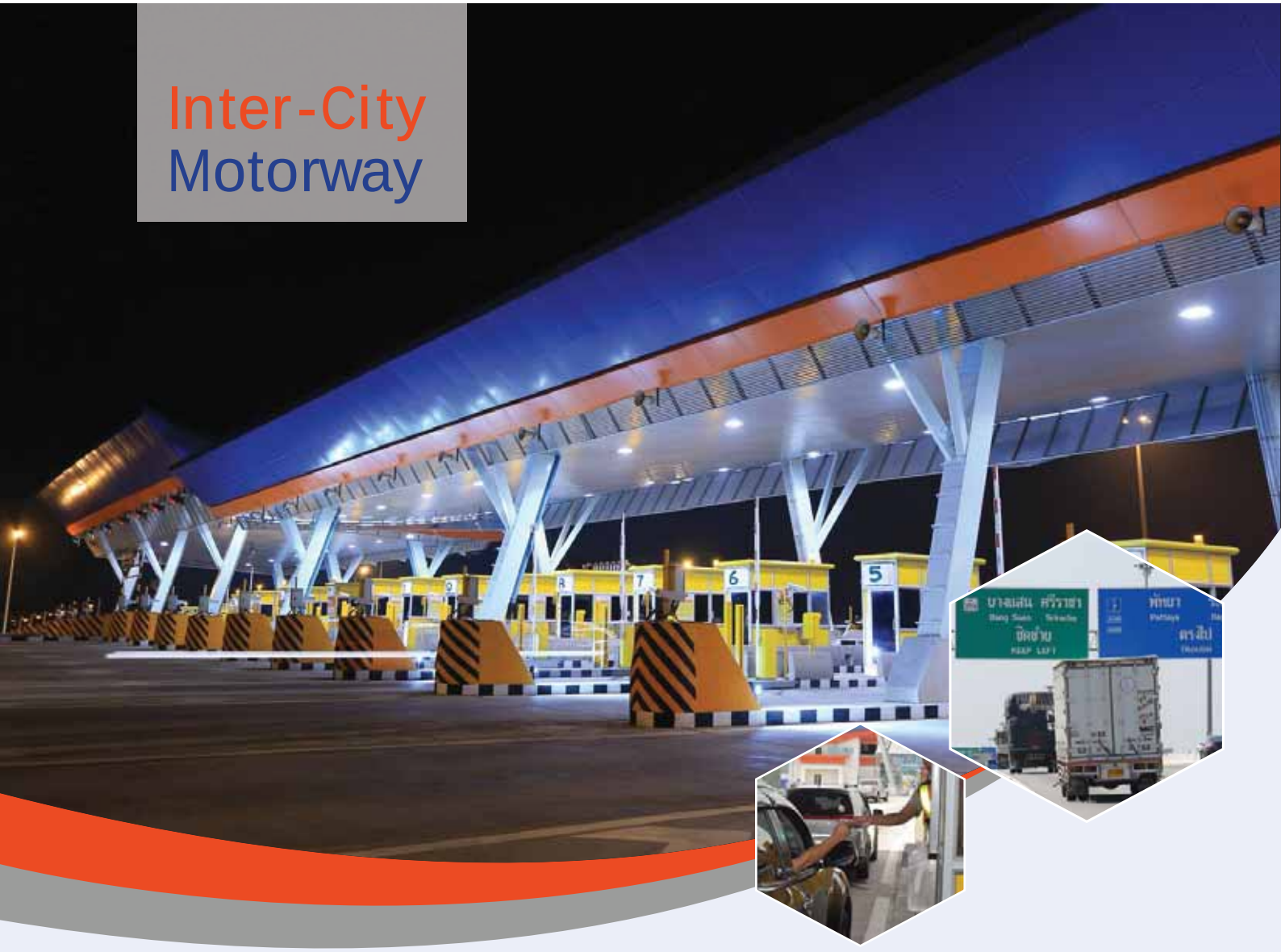
Part 5; Building up public relations to people who were affected from the expropriation for decreasing effect. The consultants took action in public relations to people who were affected from the expropriation. There are 2 public relations (2 times; 1 time / province) and there are 26 small public relations (26 times: 1 time/ Tumbon)

Benefit

The consultants surveyed and made a map to show details of immovable asset and estimate the cost for setting the compensation in right of way and making the project accomplish as the contract by using specialized knowledge of quality and experienced staffs and high technology equipment. They made the work of survey and mapping quickly and correctly and they also passed on knowledge about technology to work for this project to the staffs for the benefit of further project.


Bang Pa-in Industrial Estate
กาญจนบุรี
Kanchanaburi
อ.ท่ามะกา
Tha Maka District
ทางหลวงพิเศษ
สายบางใหญ่-กาญจนบุรี
Bang Yai – Kanchanaburi
Intercity Motorway
นครปฐม
Nakhon Pathom
จุดเริ่มต้นโครงการ
Start
นนทบุรี
Nonthaburi
อ.นครชัยศรี
Nakhon Chai Si District
กรุงเทพมหานคร
Bangkok
อ.เมืองนครปฐม
Mueang Nakhon Pathom District
ด่านนครชัยศรี
Nakhon Chai Si Toll Plaza
อ.สามพราน
Sam Phran District
นิคมอุตสาหกรรม
ราชบุรี
Ratchaburi
Industrial Estate
อ.บางแพ
Bang Phae District
ด่านตลาดจินดา
Talat Chinda Toll Plaza
Ban Phaeo District
อ.บ้านแพ้ว
Ban Phaeo Samut Sakhon District
ด่านบางแพ
Bang Phae Toll Plaza
สมุทรสาคร
Samut Sakhon
ด่านดำเนินสะดวก
ศูนย์ควบคุมระบบงาน
นิคมอุตสาหกรรม
บางปู
Bang Pu Industrial Estate
อ.เมืองราชบุรี
Mueang Ratchaburi District
ด่านราชบุรี
Ratchaburi Toll Plaza
อ.บางคนที
Bang Khonthi District
นิคมอุตสาหกรรม
สมุทรสาคร
Samut Sakhon
Industrial Estate
สมุทรปราการ
Samut Prakan
ด่านวัดเพลง
Wat Phleng Toll Plaza
ท่าเรือกรุงเทพ
Bangkok Port
ราชบุรี
Ratchaburi
ด่านปากท่อ 1
Pak Tho 1 Toll Plaza
อ.ปากท่อ
Pak Tho District
สมุทรสงคราม
Samut Songkhram
อ.อัมพวา
Amphawa District
ท่าเทียบเรือประมงบ้านปากมาย
Ban Pak Map Fishing Pier
ด่านปากท่อ 2
Pak Tho 2 Toll Plaza
Khao Yoi District
อ.เขายอย
Ban Laem District
อ.บ้านแหลม
ด่านเขายอย
Khao Yoi Toll Plaza
เพชรบุรี
Phetchaburi
อ.เมืองเพชรบุรี
Mueang Phetchaburi District
อ.บ้านลาด
Ban Lat District
Tha Yang Toll Plaza
ด่านท่ายาง
จุดสิ้นสุดโครงการ
End
อ.ท่ายาง
Tha Yang District
Cha Am District
อ.ชะอำ
สัญลักษณ์ (Legend)
ทางหลวงพิเศษระหว่างเมืองบางใหญ่-กาญจนบุรี (Bang Yai – Kanchanaburi Intercity Motorway)
ทางหลวงแผ่นดิน (Highway)
ด่านเก็บค่าผ่านทาง (Toll Plaza)
ศูนย์ควบคุมกลาง (Control Center Building)
นิคมอุตสาหกรรม (Industrial Estate)
ท่าเรือ (Port)
แหล่งช้อปปิ้ง (Shopping)
พระราชวัง (Royal palace)
อุทยาน (Park)
ชายหาด (Beach)

Inter-City Motorway



Project of Solving Traffic Congestion and Developing Toll System at Tapchang Toll Gate

Motorway No.	9
Section	Tapchang 1 and Tapchang 2 Toll Gate
Contract price	716,000,000 THB
Managed by	Inter-City Motorway Division

Background

At present, the traffic volume on motorway No. 9, sections Tapchang 1 and Tapchang 2 is more than 160,000 vehicles per day. It's forecasted to increase constantly every year. Since the existing physical conditions of road including numbers of lane and toll gate are not sufficient for traffic volume, especially in rush hour, the traffic volume and waiting ques are heavy at the toll gate. Therefore, improvement of road by expanding existing road, and developing toll gate and toll system is necessary

Objectives

(1) To expand the existing road from 8 lanes to 12 lanes between Tapchang 1 to Tapchang 2 to deserve increasing traffic volume

(2) To add 2 (two) toll booths and to arrange lane for truck for avoiding waiting que at toll gate

(3) To modify the physical condition of road to be straight way in order to make speed consistently

(4) To solve traffic problem in front of toll gate, and decrease distance and petrol

(5) To develop inter-city motorway network effectively



Highway Expansion
from 8 lanes to 12 lanes
from Tapchang 1
to Thapchang 2



Add 2 toll booths for Truck
at Tapchang 1 and improve
traffic problem at toll gate



Improve physical condition
of road, modify building
and enhance toll system
effectively

Tapchang Interchange Development Project

Inter-City Motorway 9
Section Tapchang Interchange
Contract Price 556,700,000 THB
Managed by Bureau of Bridge Construction

Background

In rush hour, the traffic volume from Suvarnabhumi Airport exit to Tapchang Toll Gate is very heavy. This coursed slow traveling to Motorway No.9, especially right direction heading from Suvarnabhumi Airport and Chon Buri on Motorway No.7 to Bang Pa-in, Motorway No.9. Due to the existing overpass is insufficient for traffic volume, additional overpass including road development to support meeting of Motorway No. 7 and Motorway No. 9 is required.

Objectives

(1) To construct Tapchang overpass to flow traffic congestion heading from Motorway No.7 (Suvarnabhumi/Chon Buri) to Motorway No.9 (Tapchang/Bang Pa-In)

(2) To expand highway from Tapchang interchange to Tapchang cannel bridge from 8 lanes to 12 lanes in order to increase traffic flexibility

(3) To manage/organise truck moving in order to reduce traffic congestion and accident

(4) To increase effectiveness of network from Suvarnabhumi Airport exit to Tapchang Toll Gate





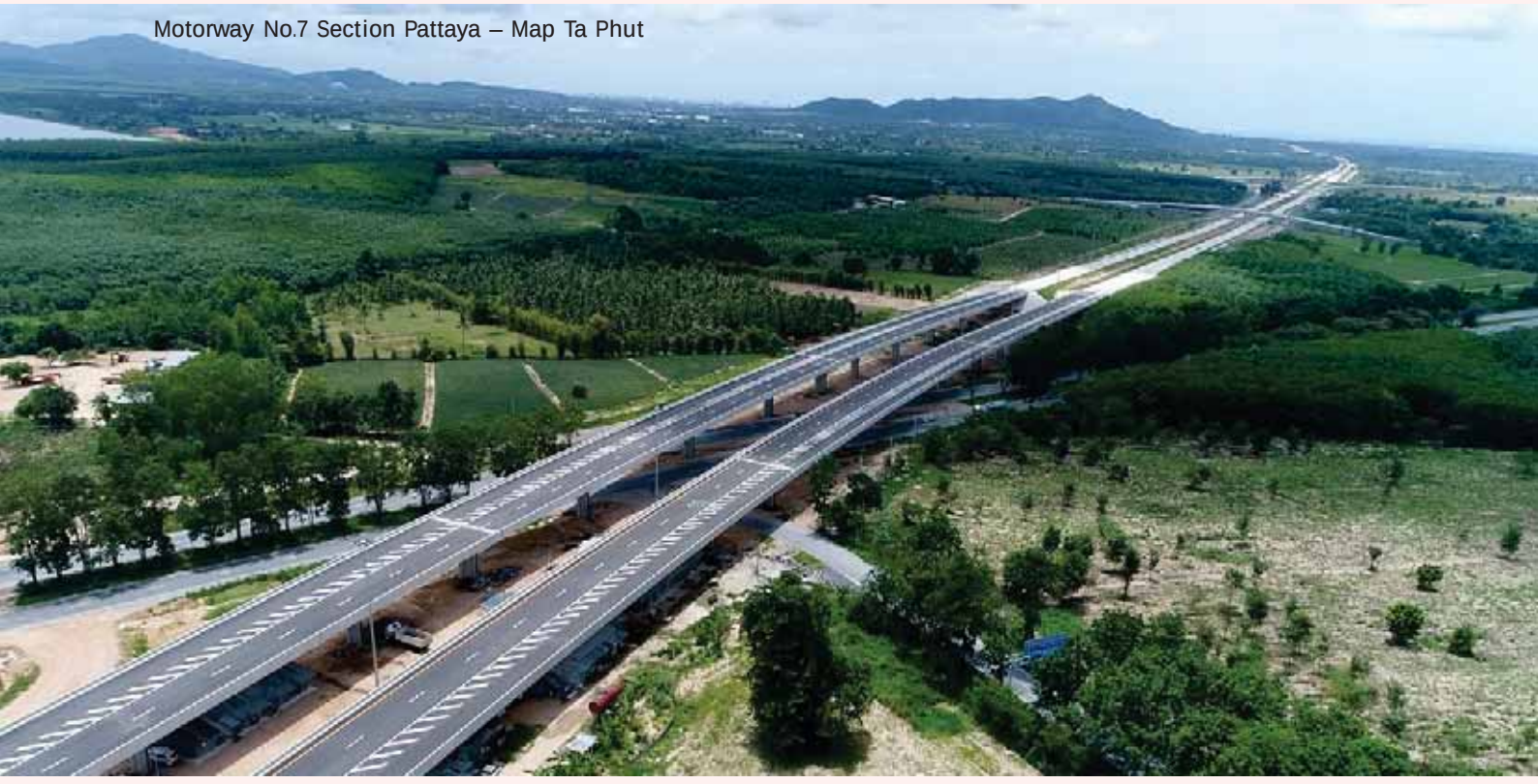
Construct two-lanes overpass heading from M7 Suvarnabhumi Airport/Chon Buri to M9 Tapchang Bang Pa-In, and to balance traffic lane heading to Tapchang

The Completed Highway Construction and Reconstruction Projects in fiscal Year 2019

No.	Highway Route No.	Project	Highway Standard	Distance (Km.)	Contract cost (Baht) Actual cost (Baht)
Highway Network Construction Project					
Highway Construction					
1	-	Chiang Rai Bypass Part I	special	9.025	902,272,111.00
					902,267,458.40
2	-	Chiang Rai Bypass Part II	special	12.014	888,697,756.00
					886,102,332.07
3	1026	Ban Donchai - Ban Pha Wiang	special	8.600	188,000,000.00
					185,817,936.35
4	218	Buriram - Amphoe Nang Rong	special	16.600	302,000,000.00
		Section Ban Sa Si Liam - Ban Khok Si Pattana			301,851,961.61
5	1	Intersection of Highway No.42 (Palobatha) - Intersection with Highway No. 4136 (Ban Thon) including Entrance to Narathiwat Airport	special	13.978	349,888,812.00
					345,313,530.63
Accelerated Four-Lane Widening of Primary Highway (Phase II)					
6	101	Amphoe Rong Kwang - Nan Section Ban Pha Moo - Ban Pang Yao	special	8.925	541,410,000.00
					541,400,639.79
7	24	Amphoe Prasat - Amphoe Khukhan - Intersection of Highway No.2085 Section I	special	35.000	1,280,206,000.00
					1,279,770,238.65
Traffic Problem Solving Activities in Bangkok, Greater Bangkok and Main Cities					
International Highway Construction Project					
8	408	Amphoe Na Thawi - Prakob Customs	special	15.966	542,735,000.00
					515,326,013.01
Highway Development Project to Support Special Economic Zones					
9	1290	Amphoe Chiang Saen - Amphoe Chiang Khong Section III	1	21.000	653,120,000.00
Rehabilitation Projects of Primary Highway Network between region					
Rehabilitation Activities of Primary Highway Network between region					
10	1	Nakhon Sawan - Salok Bat	special	20.000	589,147,299.00
					584,119,321.64
11	122	Nakhon Sawan Bypass (West)	special	12.117	542,043,000.00
					540,656,910.32
12	4	Amphoe Pran Buri - Prachuap Khiri Khan Section III	special	32.979	949,584,533.00
		(LT., RT. Sectional)			948,054,768.60

No.	Highway Route No.	Project	Highway Standard	Distance (Km.)	Contract cost (Baht) Actual cost (Baht)
Eastern Economic Corridor Highway Development Project					
Support and Development of the Southern Border Trade and Improve the Quality of Labor Project					
Support and Improvement of Infrastructure					
13	4070	Highway No. 4070 Section Yaha - Bala	1	15.545	91,993,000.00
					91,365,184.66
Intercity Motorways Project					
14		Bang Yai - Kanchanaburi Section XXIII (KM.92+000.000 - KM.96+410.000) (Kanchanaburi Interchange)	special	4.410	1,453,161,081.00
					1,416,808,849.25
Motorway No. 7 Construction Project					
15	7	Bangkok - Ban Chang Pattaya - Map Ta Phut section I	special	3.200	738,805,735.00
					735,162,703.43
16	7	Bangkok - Ban Chang Pattaya - Map Ta Phut section VIII	special	2.100	701,566,690.00
					701,365,692.89
17	7	Bangkok - Ban Chang Pattaya - Map Ta Phut section IX	special	2.875	925,164,088.26
					923,238,392.28

Motorway No.7 Section Pattaya – Map Ta Phut



Completed Highway Construction in Fiscal Year 2019

No.	Highway No.	Standard Specifications for Highway	Number of Lanes	Highway Project (Name of Project engineer) (Contractor)	Office of Highway No. Highway District	starting from km. - km. (km.)	Contract No. dated	(1) Construction Cost as the contract (2) Cost Estimate (3)Budget	Starting date of construction	Date of Contract Termination	Working days (days)	Construction Cost (Baht)			Date of Completion
												until the end of fiscal year 2561	Fiscal Year 2562	Total	
National Highway Construction															
1	208	special	4	Intersection with Highway No.2 (Ban Thapra) - Maha Sarakham (Mr.Wattana Keawnamchai) (S.Khemarat Industry Co.,Ltd.)	Office of Highway 8 (Maha Sarakham) Maha Sarakham Highway District	9+950.000 - 20+740.000,47+610.000 - 55+085.000 (18.265)	Sor Thor. 2/3/2017 15 Dec 2016	(1)648,050,000.00 (2)649,994,056.25 (3)650,000,000.00	16/12/2016	4 Apr 2019 12 May 2019	840 878	411,975,000.00	236,023,924.14	647,998,924.14	31 Mar 2019 99.99 100.00 Delivery Date 11 Apr. 2019
2	2050	special	4	Trakan Phuet Phon District - Huaiyang Section Ban Donmakmay - Ban Sansabai (Mr.Prasopporn Aunpaphorm) (S.Khemarat Industry Co.,Ltd.)	Office of Highway 9 (Ubon Ratchathani) Amnat Charoen Highway District	50+575 - 69+000 (18.425)	Sor Thor. 2/2/2017 15 Dec 2016	(1)596,109,500.00 (2)599,744,627.60 (3)600,000,000.00	16/12/2016	5 Dec 2018 4 Jan 2019	720 750	453,061,752.90	142,664,066.17	595,725,819.07	4 Dec 2018 99.94 100.00 Delivery Date 17 Dec. 2018
Accelerated Four-Lane Widening of Primary Highway (Phase II)															
1	201	special	4	Kaeng Khro District - Chum Phae District Section Kaeng Khro District - Phu Khiao District (Siriphop Sirikeaw) (Thong Ma Constructor Co,Ltd.)	Office of Highway 7 (Khon Kaen) Khon Kaen 2 (Chum Phae) Highway District.	169+075.000 - 169+904.000,177+704.000 - 199+704.000,201+424.000 - 204+504.000 (25.909)	Sor Thor. 2/4/2017 28 Dec 2016	(1)977,050,000.00 (2)979,991,772.25 (3)980,000,000.00	29/12/2016	29 Dec 2019 1 Oct 2019	960 1,007	267,983,141.93	683,114,857.38	951,097,999.31	30 Sep 2019 100.00 100.00 Delivery Date 2019
2	24	special	4	Prasat District - Khukhan District Intersection with Highway No.2085 Section Baan Krathiam - Sangkha District (Mr.Srilert Maudee)(Buriram Thongchai Construction Ltd.,part)	Office of Highway 9 Surin Highway District	218+188.973 - 243+488.973 (25.300)	Sor Thor. 2/8/2017 28 Dec 2016	(1)1,154,832,750.00 (2)1,159,994,996.38 (3)1,160,000,000.00	30/12/2016	14 s.n. 2019	1,080	788,451,053.56	366,379,192.17	1,154,830,245.73	20 May 2019 100.00 82.07 Delivery Date 25 May 2019
Highway Construction to transport System															
1	290	special	-	Nakhon Ratchasima Ring Road Section II (South Side) (Mr.Pichit Cheepprasop) (Rojsin Construction Co., Ltd.)	Office of Highway 10 (Nakhon Ratchasima) Nakhon Ratchasima Highway District	2+400 - 19+500 BK./กม. 0+000 AHD. - 12+523.486 (29.223)	Sor Thor. 2/12/2016 30 May 2016	(1)987,934,080.00 (2)988,700,251.37 (3)1,061,780,000.00	1/6/2016	16 Jan 2019 31 May 2019 17 Jul 2019	960 1,095 1,142	661,734,828.29	326,171,532.99	987,906,361.28	15 Dec 2019 100.00 100.00 Delivery Date 30 Jul 2019
2	317	special	4 6	Chanthaburi - Sa Kaeo Section IV (Mr.Teerayut Tanomwattana) (SPT Civil Group Co., Ltd.)	Office Of Highway 10 (Nakhon Ratchasima) Sa Kaeo Highway District (Watthana Nakhon)	113+500 -130+100 (16.600)	Sor Thor. 2/10/2016 31 Mar 2016	(1)572,256,000.00 (2)589,877,622.69 (3)589,880,000.00	1/4/2016	21 Mar 2018 13 Sep 2018 13 Oct 2018	720 896 926	556,042,742.44	13,306,272.49	569,349,014.93	10 Oct 2018 99.49 100.00 Delivery Date 22 Oct 2018
3	3126	special	4	Intersection with Highway No. 3 - Access to U-Tapao Rayong-Pattaya International Airport (Mr.Taweesak Jiamrattanopas) (SWK Construction Ltd.,part.)	Office of Highway 14 (Chon Buri) 2nd Chon Buri Highway District	0+000 - 3+928.313 (3.400)	Sor Thor. 2/28/2016 30 Sep 2016	(1)161,990,000.00 (2)199,986,165.95 (3)200,000,000.00	1/10/2016	22 Feb 2018 8 Aug 2018 31 Aug 2018 21 Oct 2018	510 677 700 751	90,017,256.86	65,595,289.24	155,612,546.10	20 Oct 2018 96.10 100.00 Delivery Date 8 Nov 2018
4	-	special	4	Internal road U-Tapao Rayong-Pattaya International Airport (Mr.Kittichart Rodjun) (Danusirikampol Construction Co.,Ltd.)	Office of Highway 14 (Chon Buri) 2nd Chon Buri Highway District	0+000 - 3+928.313 (3.928)	Sor Thor. 2/23/2017 24 Mar 2017	(1)152,008,200.00 (2)199,986,165.95 (3)200,000,000.00	25/3/2017	17 Jun 2018 10 Jul 2018 6 Oct 2018	450 473 562	150,134,021.98	1,870,320.00	152,004,341.98	1 Oct 2018 99.50 100.00 Delivery Date 10 Oct 2018

No.	Highway No.	Standard Specifications for Highway	Number of Lanes	Highway Project (Name of Project engineer) (Contractor)	Office of Highway No. Highway District	starting from km. - km. (km.)	Contract No. dated	(1) Construction Cost as the contract (2) Cost Estimate (3)Budget	Starting date of construction	Date of Contract Termination	Working days (days)	Construction Cost (Baht)			Date of Completion
												until the end of fiscal year 2561	Fiscal Year 2562	Total	
International Highway Network Develoment															
1	3193	special	4	Intersection with Highway No. 317 (Pong Nam Ron) - Thai Cambodian Border (Ban Laem) (Mr.Thongchai Sinsup) (The United Constructor Co.,LTD.)	Office of Highway 14 (Chon Buri) Chanthaburi Highway District	0+228 - 31+000 (30.772)	Sor Thor. 2/13/2016 31 May 2016	(1)716,105,000.00 (2)766,766,111.42 (3)766,835,000.00	1/6/2016	18 Oct 2018 17 Nov 2018	870 900	555,104,666.19	157,244,396.59	712,349,062.78	15 Nov 2018 99.48 100.00 Delivery Date 28 Nov 2018
2	3193	special	4	Khao Soi Dao District - Ban Laem Border checkpoint (Mr.Thongchai Sinsup) (The United Constructor Co.,LTD.)	Office of Highway 14 (Chon Buri) Chanthaburi Highway District	40+331.030 - 61+496.072 (21.165)	Sor Thor. 2/10/2017 26 Jan 2017	(1)697,877,877.00 (2)699,977,778.68 (3)700,000,000.00	27/1/2017	16 Jan 2019 16 Feb 2019 30 May 2019	720 751 854	376,784,746.70	320,696,619.65	697,481,366.35	23 May 2019 99.94 100.00 Delivery Date 13 Jun 2019
3	3	1	2 4	Klaeng Bypass (Mr.Supparat Muttayomnan) (Bangkok Concrete 1989 Co., Ltd.)	Office of Highway 14 (Chon Buri) Rayong Highway District	1+667 -13+200 (11.533)	Sor Thor. 2/1/2016 29 Jan 2016	(1)418,542,000.00 (2)481,639,347.80 (3)481,730,000.00	30/1/2016	19 Nov 2017 23 Feb 2018 25 Mar 2018 18 Aug 2018 2 Dec 2018	660 755 786 932 1,038	397,149,477.00	21,370,126.25	418,519,603.25	30 Nov 2018 100.00 100.00 Delivery Date 14 Dec 2018
4	12	special	4	Kalasin - Intersection with Highway No. 12 (Ban Na Krai) Section II, Part I (Mr.Siraphop Sisikeaw) (Thanasin Phatana (1999) Co.,Ltd.)	Office of Highway 8 (Maha Sarakham) Kalasin Highway District	634+378 - 670+100 (35.722)	Sor Thor. 2/16/2016 31 May 2016	(1)1,443,112,000.00 (2)1,474,690,507.06 (3)2,949,390,000.00	15/6/2016	30 Jan 2019 1 Jun 2019 9 Jul 2019	960 1,082 1,120	819,650,221.65	569,768,882.52	1,389,419,104.17	8 Jul 2019 96.59 100.00 Delivery Date 8 Aug 2019
5	12	special	4	Kalasin - Intersection with Highway No. 12 (Ban Na Krai) Section II, Part II (Mr.Wattana Keawnamchai) (Pranakornsriayuthaya Commercial & Industry Co.,Ltd.)	Office of Highway 8 (Maha Sarakham) Kalasin Highway District	670+100 - 705+813.801 (35.714)	Sor Thor. 2/15/2016 31 May 2016	(1)1,446,966,000.00 (2)1,474,694,568.76 (3)2,949,390,000.00	15/6/2016	30 Jan 2019 21 Jun 2019 7 Aug 2019	960 1,102 1,149	840,077,750.95	603,234,288.38	1,443,312,039.33	7 Jul 2019 100.00 100.00 Delivery Date 5 Aug 2019
กิจกรรมก่อสร้างทางหลวงรองรับเขตเศรษฐกิจspecial															
1	3	special	4	Trat - Hat Lek Section II, Part I (Mr.Thanakom Boonrod) (The United Constructor Co.,LTD.)	Office of Highway 14 (Chon Buri) Trat Highway District	8+550 (407+640) - 31+800 (430+890) (23.250)	Sor Thor. 2/19/2558 24 Jul 58	(1)686,437,000.00 (2)693,309,322.62 (3)1,400,000,000.00	25/7/2015	13 Jul 2017 20 Sep 2018 23 Apr 2019 23 Sep 2019	720 1,154 1,369 1,522	350,272,344.44	324,743,163.21	675,015,507.65	19 Aug 2019 98.34 98.86 Delivery Date 9 Sep 2019
2	3	special	4	Trat - Hat Lek Section II, Part II (Mr.Kongdech Teerarattanaket) (K. R. C. Engineering Part., Ltd.)	Office of Highway 14 (Chon Buri) Trat Highway District	73+750 (กม.477+840.000 ใหม่) - 89+040 (กม. 488+130.000 ใหม่) (10.290)	Sor Thor.2/18/2558 24 Jul 58	(1)695,634,000.00 (2)699,927,445.08 (3)1,400,000,000.00	25/7/2015	13 Jul 2017 28 Nov 2017 21 Apr 2018 9 Jun 2018 5 Aug 2018 15 Feb 2019	720 858 1,002 1,051 1,108 1,302	475,870,460.67	215,339,715.75	691,210,176.42	15 Feb 2019 99.37 100.00 Delivery Date 25 Nov 2019
3	3	special	-	Trat - Hat Lek Section III (Mr.Chaipong Thanaban) (Thaipipat Part., Ltd.)	Office of Highway 14 (Chon Buri) Trat Highway District	430+890 - 454+390 (23.500)	Sor Thor. 2/14/2016 31 May 2016	(1)903,266,000.00 (2)953,622,376.85 (3)954,000,000.00	1/6/2016	18 Sep 2018 19 Jul 2019 28 Aug 2019	840 1,144 1,184	358,461,812.97	519,398,262.42	877,860,075.39	25 Aug 2019 97.36 100.00 Delivery Date 9 Sep 2019
กิจกรรมก่อสร้างทางหลวงspecialระหว่างเมือง															
1	6	special	4	Bang Pa-in - Saraburi - Nakhon Ratchasima Section KM.43+772.858 - KM.45+022.858 (Mr.Chaiya Siriphan) (Nawarat Patanakarn Public Company Limited)	Office of Highway 11 (Lopburi) Saraburi Highway District	43+772.858 - 45+022.858 (1.250)	Sor Thor. 2/25/2016 28 Sep 2016	(1)883,840,200.00 (2)922,246,693.86 (3)1,619,000,000.00	29/9/2016	15 Jun 2019 1 Aug 2019	990 1,037	354,750,185.72	442,210,844.28	796,961,030.00	1 Aug 2019 99.48 100.00 Delivery Date 21 Aug 2019
2	6	special	4	Bang Pa-in - Saraburi - Nakhon Ratchasima Section KM.45+022.858 - KM.46+274.828 (Mr.Chaiya Siriphan) (Nawarat Patanakarn Public Company Limited)	Office of Highway 11 (Lopburi) Saraburi Highway District	45+022.85 - 46+274.828 (1.252)	Sor Thor. 2/26/2016 28 Sep 2016	(1)831,299,000.00 (2)867,939,787.60 (3)1,619,000,000.00	29/9/2016	15 Jun 2019 1 Aug 2019	990 1,037	255,714,400.11	531,863,808.40	787,578,208.51	1 Aug 2019 99.48 100.00 Delivery Date 16 Aug 2019
3	6	special	4	Bang Pa-in - Saraburi - Nakhon Ratchasima Section KM.46+274.828 - KM.47+600 (Mr.Thagengsak Phommee) (Nawarat Patanakarn Public Company Limited)	Office of Highway 11 (Lopburi) Saraburi Highway District	46+274.828 - 47+600 (1.325)	Sor Thor 2/27/2016 28 Sep 2016	(1)871,793,000.00 (2)911,869,590.75 (3)1,619,000,000.00	29/9/2016	16 Apr 2019 24 May 2019	930 968	658,744,350.48	160,926,233.05	819,670,583.53	26 Mar 2019 99.44 95.61 Delivery Date 2 Apr 2019









Underpass Construction Project at Ha Yak Chalong, Phuket Province

Bureau of Bridge Construction is responsible for Underpass Construction Project at Ha Yak Chalong, Phuket Province. The starting point of this project is on highway no. 4024 km.0+000 – highway no.4021 km.1+000 in the distance of 1 kilometer. The characteristic of this project is the underpass construction project in the form of Diaphragm Wall which 9.50 – 10.50 meters width and 560 meters length with 2 lanes (round trip road). The normal lane in the underpass is 3.50 meters and 4 meters width at the curve. There are also the control building which controls electric system, water pumping system, underpass drainage system, drainpipe, lightning, safety devices installation, ventilation system, road marking, and landscape improvement. Moreover, there is the construction of Dok Bua Thong clock tower roundabout with carving of Luang Poh Cham who is the former abbot of Wat Chaitararam or Chalong temple which local people pay high respect. The architectural structure with low relief reflects the identity of Phuket. As a result, the distinctive sculpture makes the roundabout to be a new landmark of Phuket.

Therefore, this project will solve traffic problem at Ha Yak Chalong. The users can get the safety and rapid transportation. Besides, this project can support the transportation, logistics, and tourism of Phuket which has traffic volume more than 100,000 cars per day. Furthermore, in the future, Department of Highways has development plan on highway no.4027 Phuket Airport – Ao Por Pier, section Baan Para – Baan Muangmai including new route to meet Highway No. 4026 (Airport Intersection) section Baan Muangmai – Baan Koh kaew and highway no.4030 Talang – Rawai beach.







Motorway No.6 Construction Project, Bang Pa-In – Nakhon Ratchasima

Bureau of Bridge Construction proceeds Motorway No.6 Construction Project, Bang Pa-In – Nakhon Ratchasima at km.125- 143 in the distance of 18 kilometers around Lumtakong, Nakhon Ratchasima province. The construction is a new route with motorway standard. It is an elevated highway with 4 traffic lanes.

This project can completely link the transportation and logistics among regions which is important for the land development, traffic solution between regions, business and tourism enhancement as the routes can support transportation and logistics through all regions. This increases the effectiveness of logistics network of country in order to be a transportation and logistics center of ASEAN.

Bureau of Bridge Construction proceeds the Thai-Cambodia Friendship Bridge (Baan Nhong Eian – Satuengbot) Construction Project, Aranyaprathet District, Sa Kaeo

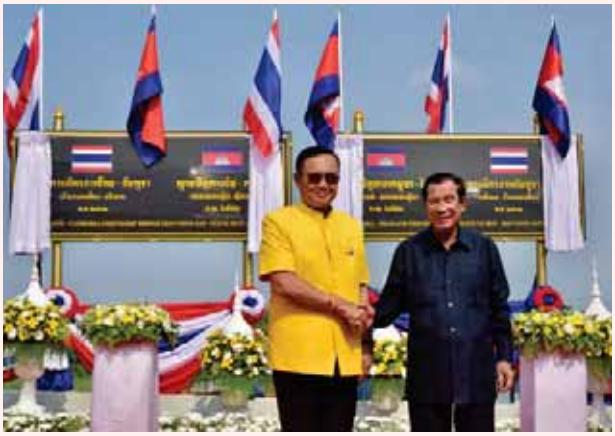


Province and Poipet Province under the budget of 860 million baht. The bridge length is 620 meters (Thai side is 405 meters, Cambodia side is 215 meters) cross PromHod canal at Baan Nhong Eian, Takam sub-district, Aranyaprathet District, Sa Kaeo Province. There is a traffic change over point and linked route in Thai side with the distance of 4 kilometers which is 4 lanes. This project starts from intersection of highway no.3366 in the total distance of 4.7 kilometers. The construction was made by Engineer Department, Royal Thai Army. Presently, the new linkage construction between Thailand and Cambodia is under construction and expected to be completed in 2022. The checkpoint building construction either in Thailand or Cambodia is under the process of pre-construction and expected that all relevant elements will be completed and can be opened in 2022.

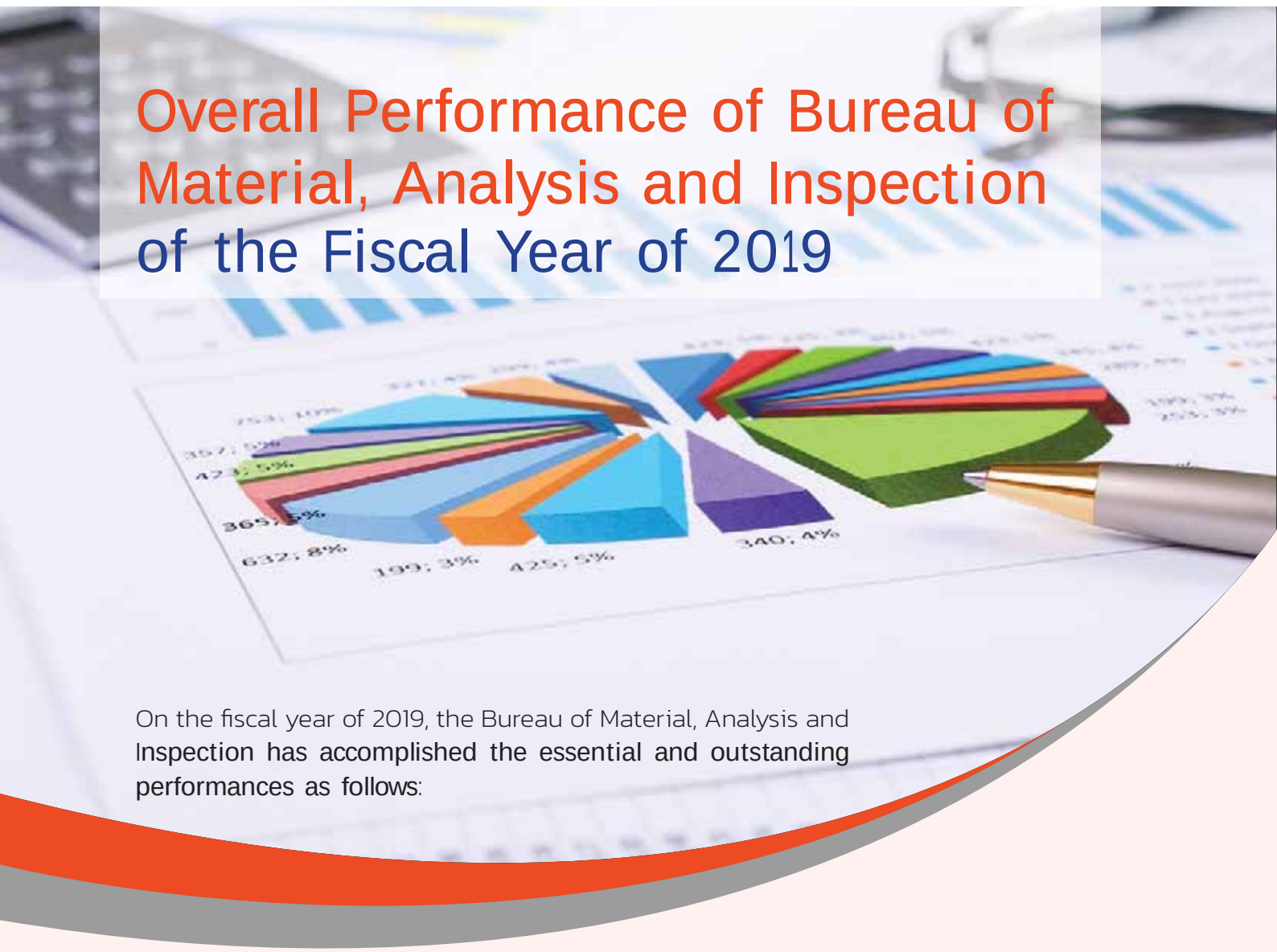
The Thai-Cambodia Friendship Bridge Construction Project (Baan Nhong Eian) is the crucial international highway network development for enhancing the linkage route with neighboring country and benefits to the ability to link all regions. This project has the route which supports highway network under many cooperation such as South Economic Corridor under the economic cooperation in Great Maekong Subregion (GMS).

- ASEAN Highway no.1, which is the crucial route of ASEAN highway network under ASEAN Economic Community, links Myanmar Thailand Cambodia and Vietnam.

- Asia Highway no.1, which is the longest route in ASIA highway network under the Economic and Social Commission for Asia and the Pacific of United Nations, links highway in Asia Region to European highway network. Moreover, it is the crucial highway network which support special economic area in Sa Kaeo Province which is the first group of economic area to be developed.



Overall Performance of Bureau of Material, Analysis and Inspection of the Fiscal Year of 2019



On the fiscal year of 2019, the Bureau of Material, Analysis and Inspection has accomplished the essential and outstanding performances as follows:

1. Road Surface Smoothness Inspection by International Roughness Index (IRI)

"Smoothness" is one of the most important factors of road surface which directly affects the convenience of road users. The Department of Highways, who serves the transportation network to public, has realized the essence of such matter. Therefore, the policy regulating the construction and road maintenance projects under the DOH supervision to inspect road surface smoothness by the International Roughness Index (IRI) has set out. The criteria of IRI are shown in the table below.

Surface type	Project type	Distance	Required IRI
Asphalt concrete	New construction project	100 meters	Not exceeding 2.0 m/km
Concrete	New construction project	100 meters	Not exceeding 2.5 m/km

In order to respond to the policy applying the International Roughness Index (IRI) on the road surface smoothness inspection, the Department of Highways, by the Bureau of Material, Analysis and Inspection, had made a preparation by procuring 2 types of effective tools as follows:

1. Walking Profiler

The walking profiler is a tool which has a frequency recording every 1 inch of a road surface at the approximate speed of 3 – 4 km/hr. Therefore, it is suitable for a small inspection project with limited inspection distance. It is mostly used to inspect in concrete pavement construction project



Walking Profiler

2. Road Inspection Vehicle The road inspection vehicle is a tool which has a frequency recording every 5 inches with laser-head reader at the approximate speed of 30 – 90 km/hr. Therefore, it is suitable for a long-distance inspection or asphalt pavement construction project.

The inspection and evaluation of road surface smoothness shall be done before the acceptance committee approves the project. Throughout the fiscal year of 2019, the Department of Highways, by the Bureau of Material, Analysis and Inspection, has performed the road surface smoothness inspection of the new construction projects in total distance of 1,960.87 kilometers.



Road Inspection Vehicle

Since the results of the road surface smoothness inspection by International Roughness Index (IRI) has been followed-up, it is found that the construction projects have punctiliously work in each process. For example, in concrete surface work, the concrete paver machine has been used for concrete pavement construction project instead human labor in order to control the better quality of road surface smoothness. In asphalt pavement construction project, higher efficient machine has been replaced the deteriorated machine. As a result, the highway under the supervision of the Department of Highways has the smoothness in accordance with the international standards and causes road users to convenient and safe.

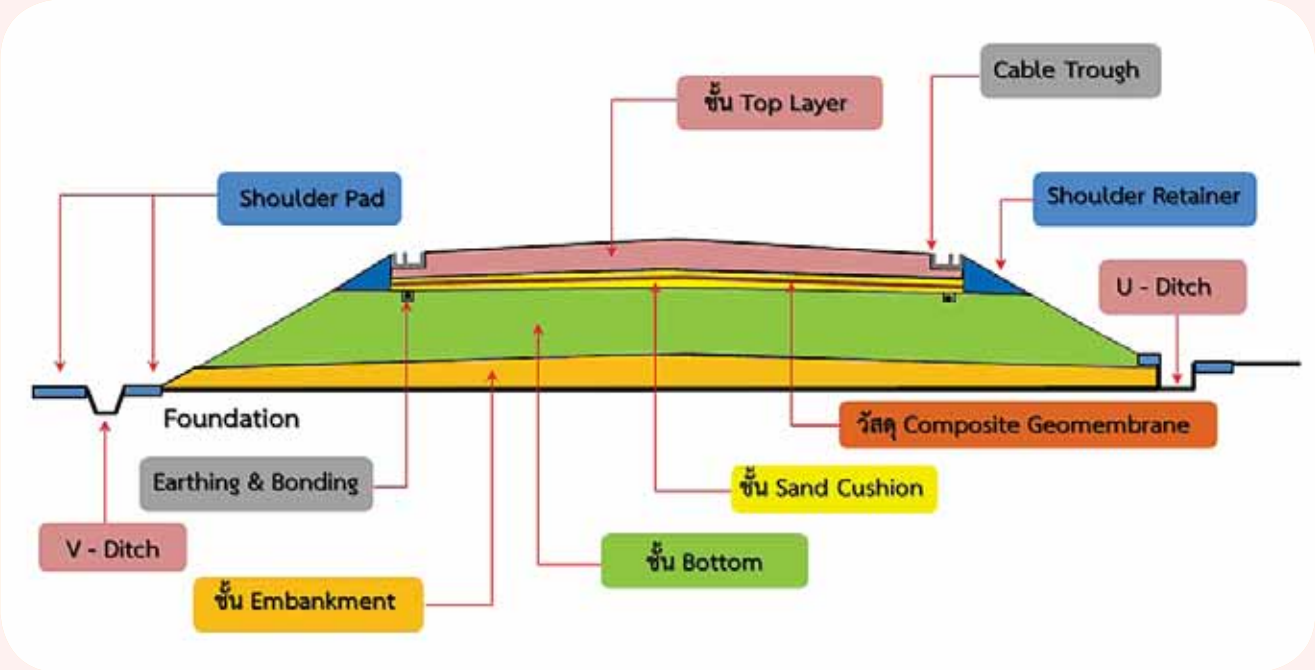
2. Quality Control of the Materials used for the foundation construction of Thailand High-Speed Rail Project

The embankment construction of Thailand High-Speed Rail Project; Phase 1 Bangkok – Nakhon Ratchasima, Chapter 1 (Klang Dong – Pang Asoke), with the distance of 3.5 kilometers, is the pilot project of Thailand High-Speed Rail Project for summarizing the issues, materials, test method, process and working method, as well as other quality control mechanisms in order to be the database for the next phase of Thailand High-Speed Rail Project. The Department of Highways, by the Bureau of Material, Analysis and Inspection, has a role on giving an advice about the preparation of the

laboratory and testing tools, material inspection for construction project, quality control of construction in accordance with the China's testing standard, as well as corporate and solve the problems regarding construction materials.

The construction procedure is divided into 2 parts which are (1) embankment materials work and (2) concrete structure on embankment work. The embankment material quality control process consists of material quality control and density inspection of each of layer starting from foundation layer, embankment layer, bottom layer and top layer. For concrete work, the inspection and quality control of the mixing materials are done before, during and after the concrete placement. Moreover, the incubation of the sample is done in the temperature and humidity control room.

The material quality control for embankment construction of Thailand High-Speed Rail; Phase 1 Bangkok – Nakhon Ratchasima, Chapter 1 (Klang Dong – Pang Asoke) would be useful as a pilot project to determine the suitable materials and the quality control process for embankment construction of railway which will be beneficial for the construction of high speed trains in the future.



High-speed rail embankment structure





Inspect the load bearing of embankment before compaction by Dynamic Penetration Test (DPT)



Subgrade Reaction Coefficient Test after compaction by Plate Bearing Test Method (K30)

Existing foundation qualification test



Sieve analysis test





Compaction test

Material qualification test of embankment layer and bottom layer
(randomly tested in every 5,000 cubic meter)



Plate Bearing Test (K_{30})



Dynamic deformation modulus (E_{VD})



Density inspection by
Sand Cone Test

Embankment layer and bottom layer qualification test after compaction







Concrete mixing qualification test







Qualification test before concrete placement and sample collection







Incubated concrete sample and compaction test of the 28-day sample concrete

3. Prevention of back slope erosion at the boundary mark no.51/50, highway no.4244, controlling zone no.0100, at Betong – Saho at the km. 2+250 – km.2+400 on the right side

Due to the back slope erosion the highway no.4244 which is boundary of the Kingdom of Thailand - the Federation of Malaysia, it caused the countries boundary mark eroded, especially between km.2+250 – km.2+400, on the right side where the boundary mark no.51/50 fell down. This area is considered as the area in need of urgent repairing and damage prevention.



Eroded back slope on the highway no.4244 at approximately km.2+250 – km.2+400



The boundary mark no.51/50 (before damaged)

Since the geological feature of the soil in this area is decomposed granite which has low adhesion ability. Moreover, the embankment slope is highly steep due to the back slope cutting which is limited by the boundary of Malaysia where proper slope ratio needs a large area in Malaysia to be cut. In this regard, the Department of Highways, by the Bureau of Material, Analysis and Inspection, has made a recommendation design for back slope prevention and repair as follows:

1. Install soil nail at the top of the back slope according to its highly steep area;

2. Construct and install the diversion ditch to prevent surface water down on the slope;

3. Construct and install the steel fiber shot-crete on the surface of adjusted slope by spraying throughout the area of the slope;

4. Side Ditch Construct and install the surface drainage system such as stepped drain chute or concrete side ditch.

Moreover, the Royal Thai Survey Department has made an urgent discussion between two relevant agencies of both countries since this area are involved in the national security matter. In this regard, the Department of Highways, by the Bureau of Material, Analysis and Inspection, has assigned the experts in geology as the representative to attend the meeting and inspect the damaged area. After the meeting between the two countries, in order to prevent the effect of the national security matter, they agreed that the Department of Surveying and Mapping of Malaysia and related agencies to change the work scope are as follows:

1. Uninstall the diversion ditch on the top of the slope. It shall be constructed in the area of Malaysia.

2. Adjust ground area of the boundary mark no.51/50 construction from "filling the soil 1.5 meter from Thailand's side and cut the slope in the Malaysia's side to adjust into 2.5 meters" into "filling the soil 2.0 meters and adjust into 1 meter in Malaysia's side".

3. A ladder should be constructed in front of the slope for convenience for inspection of the boundary mark from both country sides.

According to the discussion and the change of work scope, there is no effect on the slope stability. The Royal Thai Survey Department also informed that there are no advantages or disadvantages on the terms of area. Therefore, it does not object to the change of work scope. The detail design is in the recommended design no.SP (R4244-YALA-18) 2.



Damaged back slope field inspection on the highway no. 4244 at at Betong – Saho by the Department of Highway officer

The recommendation designed for back slope prevention and repair could be applied on the boundary area no.51/50, the highway no.4244, controlling zone no.0100, at Betong – Saho at the km.2+250 – km.2+400 on the right side and it could also be adapted to prevent similar problems in other areas in the future.

4. The analysis and testing of road safety tool

According to the government's policy to promote the domestic use of natural rubber in the country. Therefore, the Department of Highways applied it on the road safety tools. The Bureau of Material, Analysis and Inspection has carried out an analysis and testing of the natural rubber guide post according to the specifications in details as follows:

1. Quantity and natural rubber grade test including the amount of natural rubber (TGA) compared to the weight ratio;

2. Physical test including hardness, tensile strength, elongation and compression set;

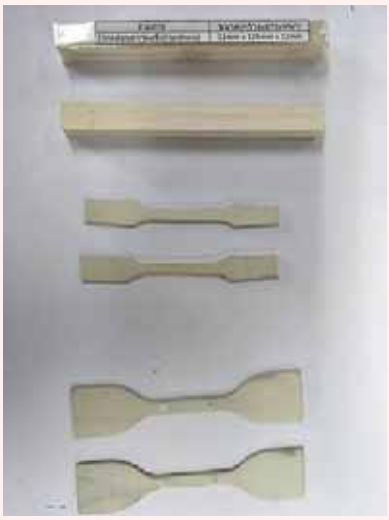
3. Durability test including ozone resistance and heat resistance;

4. Safety test including flammability self-extinguishing.

In addition, the analysis and testing of the natural rubber guide post is also considered as one of the quality control in the road safety work by the Department of Highways with the aims to use it in accordance with the specifications, durability and the government's policy to promote the use of natural rubber.



Natural rubber guide post



Samples



Ozone resistance testing



Tensile testing

Development and Integration



Development and Integration of DOH Research Repository System

The Department of Highways has responsibility to maintain over 69,000 kilometers of highways across the country. The assessment of highway performance in 4 areas: (1) the strength of the road structure, (2) smoothness, (3) surface condition, and (4) surface friction is the important missions to provide the road user with convenience and safety on highways. Currently, the Department of Highways has information systems which stores pavement information and various performance test results. However, these information are still lacking of integration to provide efficiently analysis.

In addition, the Bureau of Road Research and Development also recognises the importance of collecting and disseminating research papers of the Department of Highways for broad use. The existing electronic document systems, however, still do not meet the requirements such as: unable to analyze statistical research data, unable to present a research overview, not having a graphic summary, unable to organize and make a summary report, unable to categorise or classify research to find the paper, etc.

For the integration, the DOH Research Repository System can be linked to Roadnet System of the Bureau of Highway Maintenance Management, MIIS System of the Bureau of Materials Analysis and Inspection, Plannet System of the Bureau of Planning, and TIMS System of the Bureau of Highway Safety.

The Development of Highway Performance Database System

The Bureau of Road Research and Development has collected highway performance data from various relevant agencies to gather big data for use in the development of highway performance prediction models and support Artificial Intelligence (AI) for budget planning, maintenance and restoration of future highways. According to the related agencies, the highway performance survey data are still scattered in various information systems such as Roadnet System of the Bureau of Highway Maintenance Management, MIIS System of the Bureau of Materials Analysis and Inspection, Plannet System of the Bureau of Planning, and TIMS System of the Bureau of Highway Safety.

This project is a pilot project to gather information related to highway performance to analyse, and also process raw data from various sources in to the form of a standard data and create a data set for academic and management purpose. A large number of raw data which were surveyed in each fiscal year would be processed into various statistical values such as average, standard deviation, amount of data, and 85th percentile. Both raw and processed data would be stored in the data warehouse for the program to retrieve data for display in various formats. This project presents data in 4 formats: map, table, Spatial Variation, and Temporal Variation as shown in Figure 1 to 4. In addition, users are able to download data sets to use in other analysis tasks as well.



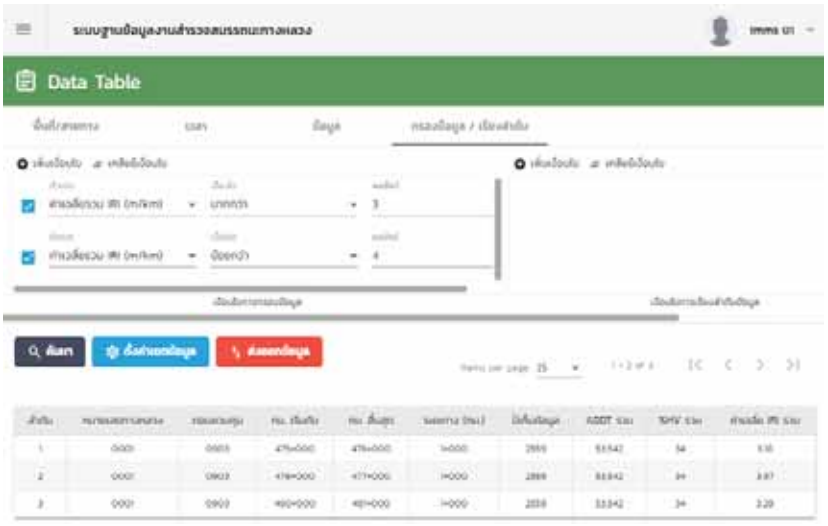


Figure 1 Example of table data display

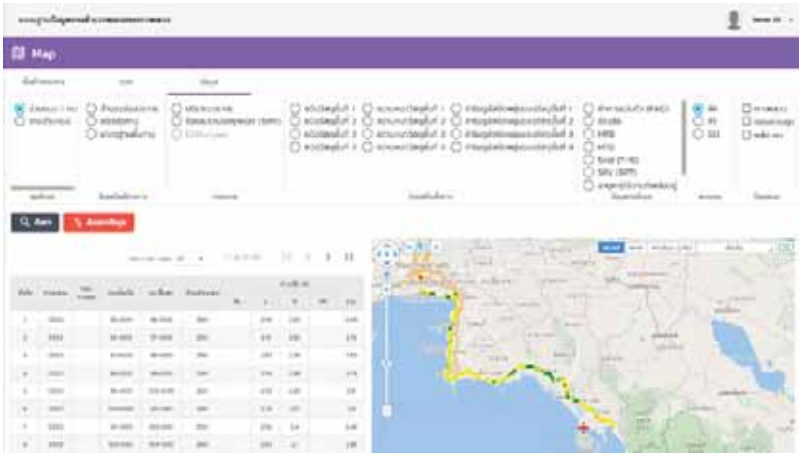


Figure 2 Example of map display



Figure 3 Example of Spatial Variation

The Development of Research Database System

The research database system is a system for collecting various types of research documents from the Department of Highways, e.g., research reports, research and development reports, and final reports and executive summary reports of each research project. The document will be converted into an electronic document file such as PDF to be stored in the database.

The research database was designed to have a search system similar to Google Search. Users can enter any search terms which may be keywords, titles, authors' names, etc. For example, if you want to search for "bearing" as shown in figure 5, the system will display the most relevant documents for the search term as shown in figure 6. In addition, users can filter search results by choosing the released date. The system will filter only the research in that year as shown in Figure 7.



Figure 5 The example of searching input

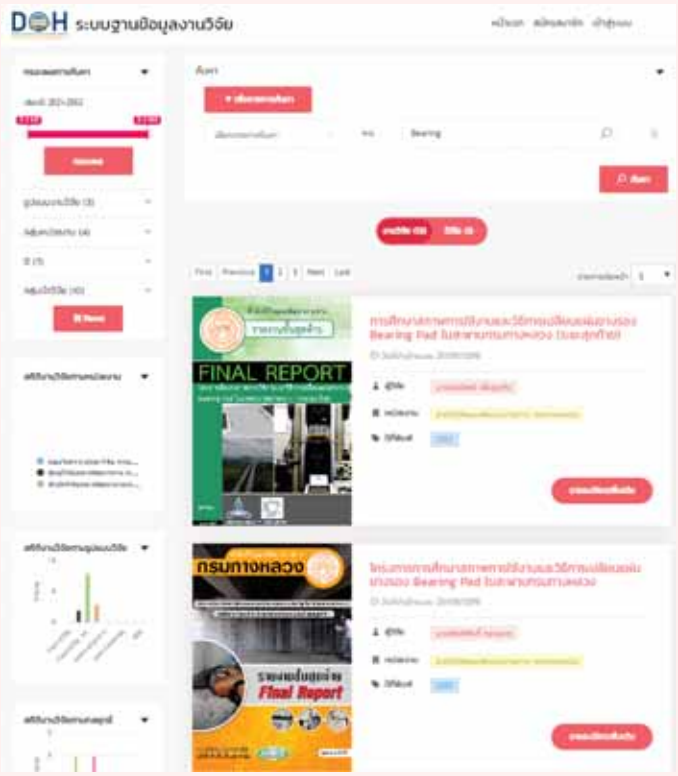


Figure 6 The example of searching result

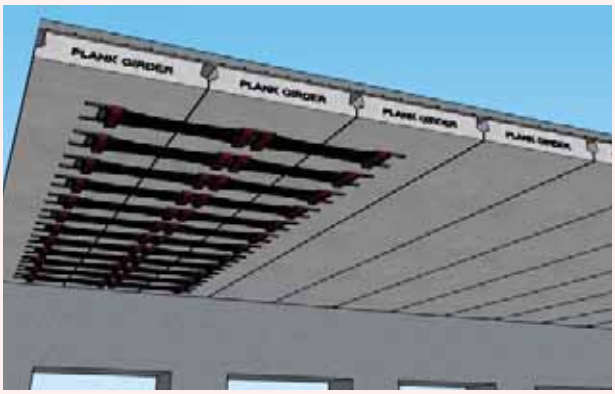
Development of Natural Rubber Fastener for Bridge Strengthening

This project is conducted as part of a comprehensive promotion on the consumption of domestic natural rubber by the Royal Thai Government. Prototype pre-stressing natural rubber strip (PNRS) for enhancing shear key and flexural serviceability of PC Plank Girder, PC Box Beam, and RC T-girder has been developed in this study.

PNRS applies the concept of external pre-stressing in which plain natural rubber bearing pad conventionally used to transmit gravity loads is stretched along its length to generate tensile force. The pre-tensioned strip is attached, and the tensile force is then released to strengthen the bridge member. It is recommended in this study that plain natural rubber bearing pad of Hardness 50 (TIS 951-2533) with the width of 20 cm, the thickness of 4 cm, and the length of 25 to 50 cm shall be stretched along its length at 100%-strain. The ease of installation is the major concern in the production of PNRS. System Rubber Grip (SRG) has been developed for this task to restrain the tensile force. The holding device in SRG can be unlocked later when the attachment is completed. Figures below show unstretched plain natural rubber bearing pad, PNRS supported by SRG, and graphic presentation of installation of PNRSs for strengthening of a shear key of PC Plank Girder Bridge.



Unstretched plain natural rubber bearing pad and PNRS supported by SRG.



Graphic presentation of installation of PNRSs for the strengthening of the shear key of PC Plank Girder Bridge.

Full-scale laboratory tests of 7-m span PC Plank Girder and 15-m span RC T-girder show that PNRS can enhance flexural as well as shear key serviceability. However, due to significant relaxation of PNRS, utilizing PNRS is limited to temporary strengthening pending for major restoration or special strengthening in case of traverse by permitted overloading trucks. Conservatively, PNRS should be in service no more than three months. Weight and speed limits of truck traffic are recommended as follows.

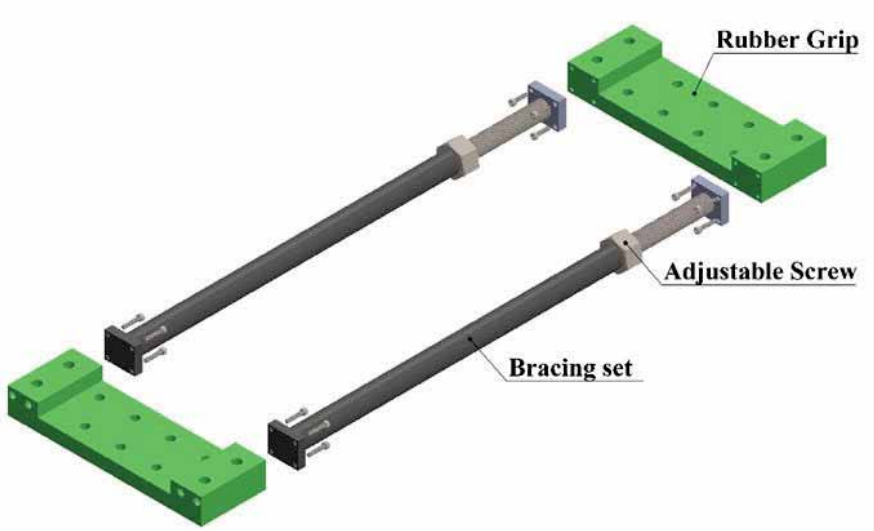
- In case of shear key strengthening
  - Damage of shear key of no more than 50% - Truck weight limit of 25 tons with normal speed shall be imposed.
  - Damage of shear key of more than 50% but no more than 75% - Truck weight limit of 15 tons with normal speed or truck weight limit of 25 tons with speed limit of 10 km/hr. shall be imposed.
  - Damage of shear key of more than 75% - Truck weight limit of 15 tons with normal speed or truck weight limit of 21 tons with a speed limit of 10 km/hr. shall be imposed.

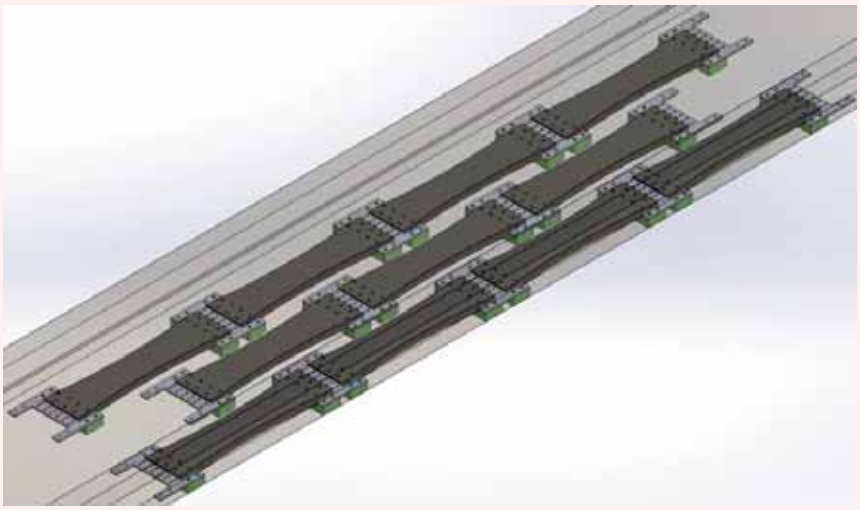
- In case of flexural strengthening – Shear key or load transfer mechanism shall be in good condition with no damage. The maximum permissible weight is 32 tons.

Recommendations

1) Field evaluation shall be continuously performed every three months for a period of at least one year to validate long term performance of PNRS.

2) The new mixed proportion of compound natural rubber shall be designed specifically for PNRS in order to alleviate the relaxation problem.





The Study of Appropriate Correlated Color Temperature and Luminance Level for Road Lighting Application

This research was conducted to study the lighting variables of HPS (High-Pressure Sodium) lamps and LED (Light Emitting Diodes) lamps. Currently, there is no lighting standard in Thailand for LED lamps. The objective of this research is to study the luminance, correlated colour temperature, and the satisfaction of the driver in the actual operating conditions. The lamps used in the experiment was designed in accordance with EN13201 standards. The aim of testing is to compare the HPS 250 W lamp and the LED lamp with different colour temperatures (3000K, 4000K, and 5700K) that can adjust the brightness level to compare three important parameters: Luminance, Uniformity and Disability Glare.

A Photometer Imaging Light Technique and a Color Temperature Meter technology were used to measure the luminance parameters of the light conditions. In addition, a Visual Performance test was conducted by allows the tester to sit on a car that runs on the test path to measure the sight distance from the tester to an experimental sign. The test also includes satisfaction measurement in each lighting condition by considering three factors: eye comfort, the clarity of the sign, and the uniformity of light

Considering the satisfaction factors, the study found that the colour temperature of the light in the LED lamp does not affect the visibility and the consistency of light, but affects the comfort of the eyes. 82% of the respondents were satisfied with every colour temperature of LED lamps more than or equal to HPS. The brightness level affects comfort and light consistency.

In terms of visibility, it was found that in LED lighting conditions, the height of the sign at 30 and 15 centimetres has the highest and lowest average sight distance respectively. In addition, the brightness of the light also affects the sight distance directly. LED lamps provide longer sight distance more than HPS lamps at 100% brightness level, equal sight distance at 75% brightness level, and shorter sight distance at 50% brightness level. In which the colour temperature of light does not affect the sight distance.

In conclusion, from considering all three aspects of satisfaction, energy-saving, and average sight distance, it is found that the first three best lighting conditions are LED lamps at 4000K, 5700K and 3000K colour temperatures at 100% brightness

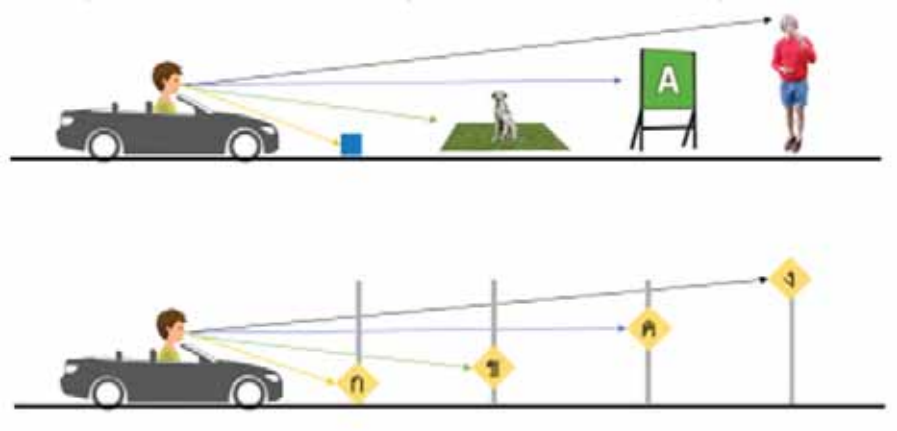


Figure 1: Evaluation model for measuring the visibility of traffic sign height at 30, 50, 100, and 150 cm.

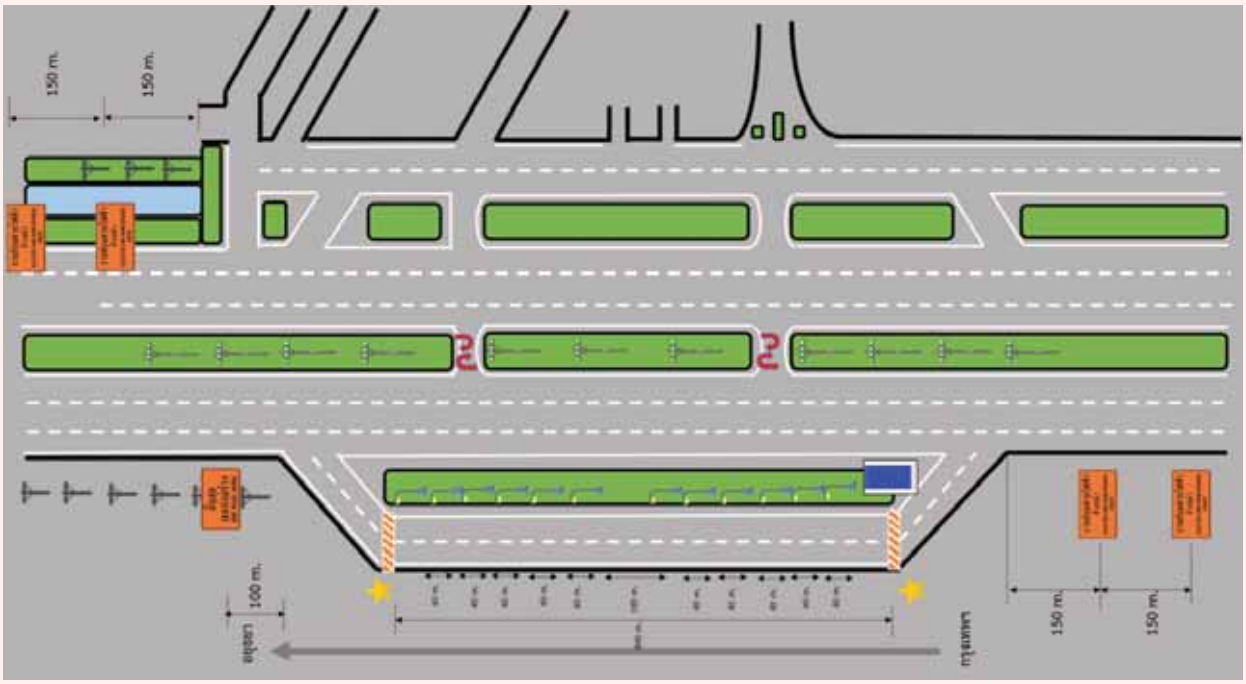


Figure 2: Illustration of the test section

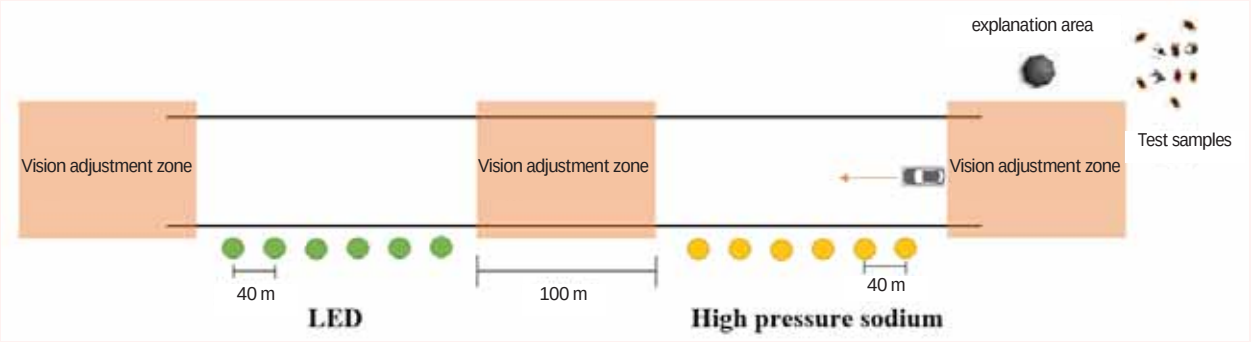


Figure 3: LED lamp installation scenario with a colour temperature of 3,000, 4,000 and 5,700 K and High-Pressure Sodium 250 W for Visual Performance Testing.



Figure 4: The test section on Highway No.347 Sta.23+000 – 24+000
(located at 14°12'34.6"N 100°32'45.5"E - 14°12'60.0"N 100°32'35.1"E)



Figure 5: The installation of LED lamp and a Visual Performance Testing tool

Luminance	Colour temperature	Eye Comfort	Sign clarity	Uniformity of light	Average Sight Distance	Total score
100%	3000K	2.55	5.00	4.45	3.65	18.94
	4000K	5.00	4.24	4.38	5.00	22.29
	5700K	3.14	4.59	5.00	3.93	20.14
75%	3000K	5.00	3.54	1.59	3.01	17.20
	4000K	4.14	1.43	1.91	2.81	14.71
	5700K	4.38	2.85	2.52	3.05	17.03
50%	3000K	0.00	0.71	0.00	0.00	5.52
	4000K	1.91	0.00	0.95	1.33	9.20
	5700K	3.14	3.20	2.21	0.97	14.32
HPS		1.27	2.50	1.59	3.23	8.60

The summarize table for the testing scores of LED lamps
(3 colour temperature and 3 luminance levels) and HPS lamps.

Highway Maintenance



The highway maintenance is the major mission of DOH. However, the budget that DOH received in each fiscal year quite limited. Therefore, the maintenance operation is systematically planned and monitor that can increase the efficiency of maintenance operation under the limited budget.

In fiscal year 2019, DOH received the budget for maintaining the network around 20,893.8029 Million Baht which were allocated in many activities as followed;

1.	**Objective 1 : Developed network**		
	1) Highway management and assisting	396.3090	Million Baht
	1.1 Residential building construction budget	142.9090	Million Baht
	1.2 Office building construction budget	253.4000	Million Baht
2.	**Objective 2 : Maintained network**		
	1) Highway maintenance activities	18,240.7394	Million Baht
	1.1 Routine maintenance	5,625.3600	Million Baht
	1.2 Periodic maintenance	4,109.5500	Million Baht
	1.3 Special maintenance	6,363.0086	Million Baht
	1.4 Rehabilitation activities	2,142.8208	Million Baht
	2) Urgent maintenance	200.0000	Million Baht
3.	Inter Region Maintenance Project	2,017.3000	Million Baht
4.	Survey and Evaluate Highway network Project	39.4545	Million Baht

There are different and specific in each activity as followed

1. Routine Maintenance



Routine Maintenance

Type of Routine Maintenance

1.1 Pavement Maintenance

Maintenance of Asphalt Pavement

1) Crack Filling
2) Surface Sealing
3) Surface Leveling
4) Skin Patching
5) Deep Patching
6) Surface Grinding

Maintenance of Concrete Pavement

1) Repair of Joint Sealing
2) Crack Sealing
3) Concrete Pavement Leveling
4) Concrete Pavement Patching

1.2 Sidewalk, Connection Road, Median and Bicycle-lane Maintenance

Repair of Sidewalk, Connection Road, Median and Bicycle-lane

1.3 Drainage System, Bridge and Structure Maintenance

Drainage System

1) Maintenance of Open Channel
2) Maintenance of Culvert

Bridge and Structure

1) Maintenance of Bridge and Structure
2) Repair of Bridge Approach Motar Rip-Rap
3) Repair of Retaining Structure
4) Repair of Pedestrian Bridge or Underpass
5) Repair of Tunnel

1.4 Traffic and Safety Device Maintenance

Maintenance of Traffic Sign and Marking

1) Repair of Traffic Sign
2) Traffic Painting and Marking

Maintenance of Safety Device

1) Maintenance of Guard Rail, Guard Fence, Guard Cable, Barrier, R.O.W. Fence, Barricade, Crash Cushion and Others
2) Maintenance of Guard Rail, Guard Fence, Guard Cable, Barrier, R.O.W. Fence, Barricade, Crash Cushion and Others
3) Maintenance of Other Safety Devices

Maintenance of Road Lighting and Traffic Signal

1) Maintenance of Road Lighting
2) Maintenance of Traffic Signal

2. Periodic Maintenance

Type of Periodic Maintenance

2.1 Asphalt Seal Coating

2.2 Asphalt Overlay

2.3 Replacement of Joint Sealing





Periodic Maintenance

3. Special Maintenance

Type of Special Maintenance

3.1 Surface Leveling

3.2 Major Repair of Asphalt Pavement

3.3 Asphalt Hot Mix Recycling

3.4 Major Repair of Concrete Pavement

3.5 Major Repair of Side Slope and Back Slope

3.6 Major Repair of Bridge Structure and Highway Structure

3.7 Rehabilitation of Asphalt Pavement

3.8 Rehabilitation of Concrete Pavement





Special Maintenance

4. Disaster rehabilitation activities





Disaster rehabilitation activities





Disaster rehabilitation activities on Highway 4070
KM.29+000 – KM.29+733

5. Urgent maintenance





Disaster rehabilitation
activities on Highway 1249 KM.14+700 – KM.14+850

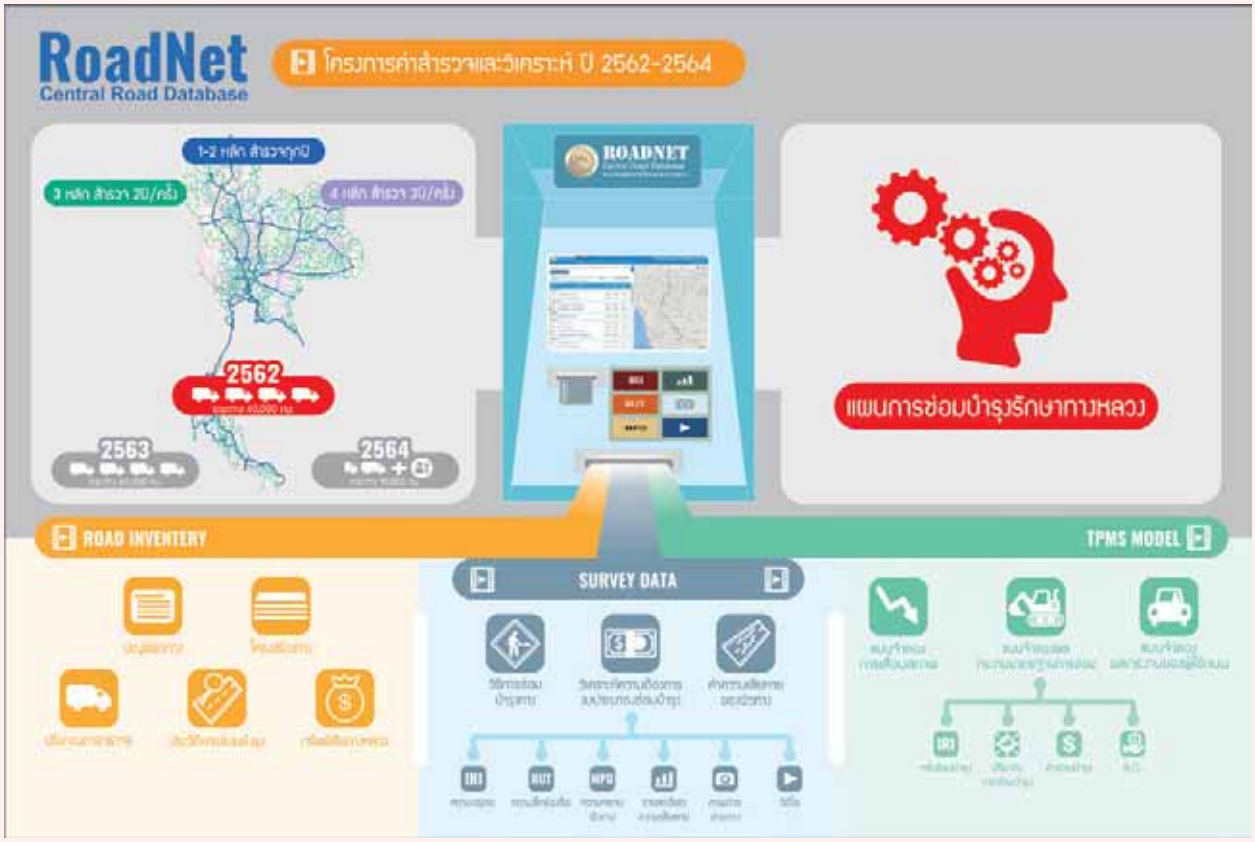
6. Inter Region Maintenance Project





Urgent maintenance

7. Survey and Evaluate Highway network Project



Survey and Evaluate Highway network Project

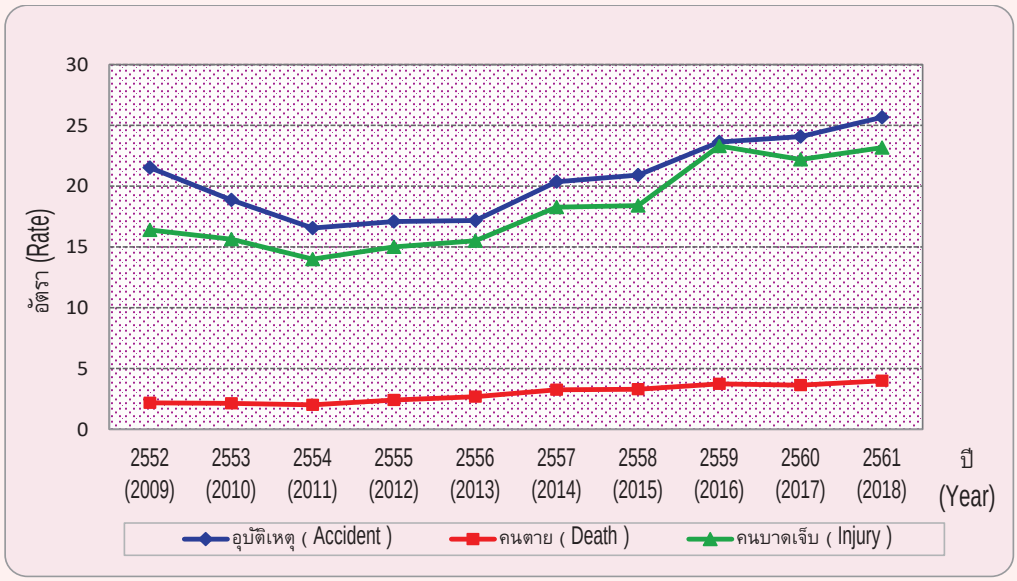
Highway Safety Operation

The road accident data

In 2018, The accidents on Thailand national highway have been recorded in the Highway Accident Information Management System (HAIMS) which is Web-based Application that can record the accident in real-time. The data show that there are 25,577 crashes occur on the highway network which makes 328,145 million baht loss in the economic system, and the primary cause of the accident (around 74%) is the over speed driving.







The accident rate per 100,000 population on 2009-2018

YearYear	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Accident	13,673	12,054	10,607	11,013	11,125	13,259	13,575	15,578	15,936	17,045
Deaths	1,378	1,370	1,291	1,549	1,740	2,115	2,136	2,464	2,409	2,651
Injuries	10,415	9,991	8,970	9,675	10,043	11,906	11,948	15,365	14,692	15,383

Traffic Volume

In 2018, Traffic volume on the highway network is equal 276,817 Million vehicles – Kilometre which is composed of 36.84% of the truck, 47.8% of passenger cars and 15.36% of two-wheel vehicles.

Traffic volume on the highway network on 2008-2018



million vehicles-kilometre

ปี	2551 (2008)	2552 (2009)	2553 (2010)	2554 (2011)	2555 (2012)	2556 (2013)	2557 (2014)	2558 (2015)	2559 (2016)	2560 (2017)	2561 (2018)
Truck	63,096.2	65,336.1	66,671.5	71,863.2	78,058.8	84,223.2	89,795.5	93,611.9	97,620.0	99,019.0	101,983.2
Passenger Car	73,811.2	79,978.1	80,796.0	89,410.4	99,282.4	109,311.4	117,817.8	122,297.4	127,211.7	129,187.9	132,390.4
Two-wheels Vehicle	31,128.7	32,681.4	33,219.4	34,263.9	35,460.0	38,573.8	40,421.1	40,273.0	41,097.1	41,659.3	42,543.5

Traffic volumes on the Thailand national highways from Bangkok and the city on the central region to others regions. (Veh/Day)

To the northern region

Route	2016		2017		2018		Changing ratio	
	In	Out	In	Out	In	Out	In	Out
1	61,251	59,270	65,860	64,662	59,566	58,251	-1.02	-0.41
9	24,264	21,498	28,069	31,528	28,460	32,497	8.54	24.86
32	58,617	52,661	55,188	60,263	61,845	63,825	3.11	10.17
North	48,044	44,476	49,706	52,151	49,957	51,524	1.98	8.03





To the northeastern region

Route	2016		2017		2018		Changing ratio	
	In	Out	In	Out	In	Out	In	Out
1	61,251	59,270	65,860	64,662	59,566	58,251	-1.02	-0.41
9	24,264	21,498	28,069	31,528	28,460	32,497	8.54	24.86
305	17,565	18,492	16,968	18,891	17,473	19,594	-0.21	2.94
North east	34,360	33,087	36,966	38,360	35,166	36,781	1.36	5.91

To the southern

Route	2016		2017		2018		Changing ratio	
	In	Out	In	Out	In	Out	In	Out
4	55,512	56,856	54,448	55,264	58,807	59,129	3.04	2.10
35	58,163	56,787	57,254	57,066	62,782	55,712	4.05	-0.94
338	36,472	39,327	35,957	38,963	25,456	42,786	-15.31	4.44
South	50,049	50,990	49,220	50,431	49,015	52,542	-1.04	1.55



To the eastern

Route	2016		2017		2018		Changing ratio	
	In	Out	In	Out	In	Out	In	Out
7	49,182	51,153	50,973	51,716	52,535	51,578	3.35	0.42
9	77,639	77,562	77,387	98,027	89,440	69,750	7.63	-1.23
34	114,608	134,187	112,848	128,278	105,808	132,075	-3.89	-0.72
304	19,955	18,032	36,376	36,364	36,547	38,614	41.38	53.93
305	17,565	18,492	16,968	18,891	17,473	19,549	-0.21	2.82
East	55,790	59,885	48,716	56,312	60,361	62,313	5.61	2.35



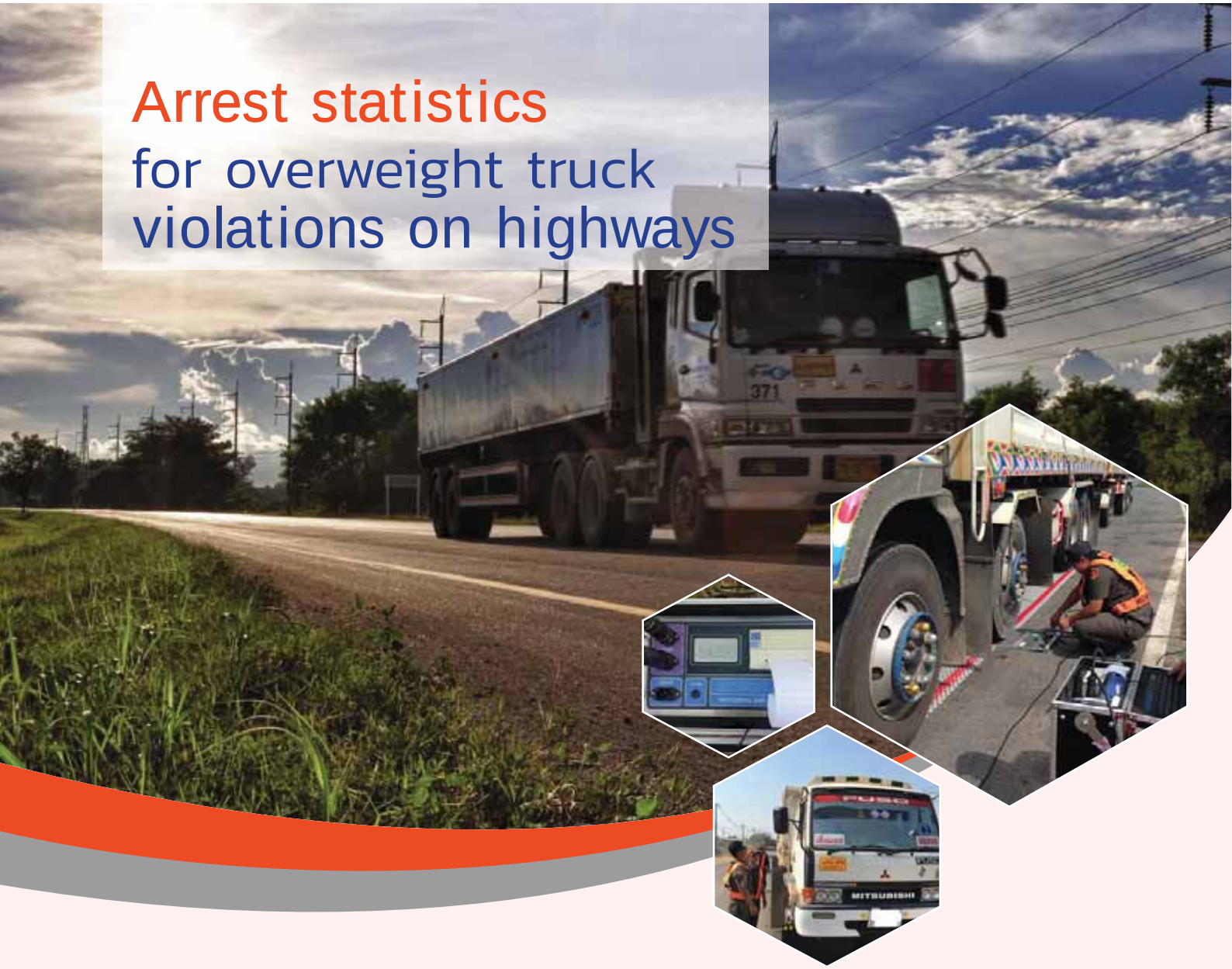


To the western region

Route	2016		2017		2018		Changing ratio	
	In	Out	In	Out	In	Out	In	Out
4	55,512	56,856	54,448	55,264	58,807	59,129	3.04	2.10
9	108,791	99,979	100,496	107,981	72,530	108,293	-17.73	4.15
35	58,163	56,787	57,254	57,066	62,782	55,712	4.05	-0.94
338	36,472	39,327	35,957	38,963	25,456	42,786	-15.31	4.44
340	37,930	36,007	37,476	35,369	40,112	37,434	2.92	2.03
West	59,374	57,791	57,126	58,929	51,937	60,671	-6.43	2.46



Arrest statistics for overweight truck violations on highways



Report of operation of Traffic Weight Control in the fiscal year 2018 – 12 months

1. Arrest statistics for overweight truck violations on highways

The Department of Highways by the Office of Traffic Weight Control has arrested overloaded cars at all Weigh Control Stations and has monitored law violators by Mobile Weigh Check Units, Spot Check. In the fiscal year 2019, the total number of records on enforcement against overweight trucks from 1 October 2018 to 30 September 2019 was 4,078. It was then reported to The Department of Land Transport to inspect any act against the law such as illegally modified vehicles, which were expected to be 115 cars. Over 3 years, the total number of records on enforcement against overweight trucks have been reported 13,547 in total.

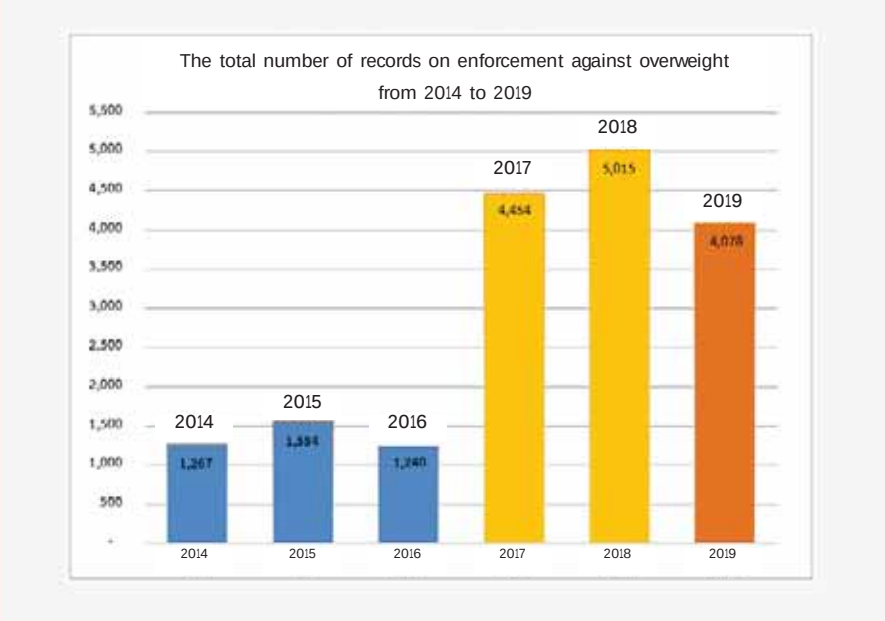


Figure 1. The total number of records on enforcement against overweight from 2014 to 2019

2. The process of requesting and obtaining a license of permission at one stop service center.

The Department of Highways initiates the One-Stop Service Center on 21 September 2018 to support the software system and database to evaluate the public service and truck operators who ask for permission of special trucks or other trucks. It aims to facilitate those trucks to travel on highways more effectively

The Department of Highways has been implementing software system and database to facilitate the process of requesting and obtaining a license of permission. Primary data has been collected from DOH's bridges and roads. This information is then analyzed the load-carrying capacity and expected damage due to overweight vehicles and develops the GIS database to establish the One Stop Service which will facilitate the issuing of licenses and improve the efficiency of operations.

Licenseing for those trucks carrying less than 150 tones traveling on highways shall be issued within 15 days which have to comply with the Director General of The Department of Highways' policy. The total number of records on the permission during 1 October 2018 and 30 September 2019 was 136 in total.

Number of Records on the License of Permission, year 2015 - 2019

Fiscal year	Number of Route(s)
2015	12
2016	17
2017	82
2018	118
2019 (1 October 2018 – 30 September 2019)	136

3. Progress report of Weigh Station Construction and Truck Area Project

The Office of Traffic Weight Control has invested in Weigh Station Construction Project and Truck Rest Area to support the transportation demand in the whole country. This project composes of the following:

3 Completed Truck Rest Area Construction Projects

No.	List(s)	Status
1	Truck Rest Area – Non Soong (Arrival)	Open to public in 2017
2	Truck Rest Area – Non Soong (Departure)	Open to public in 2018
3	Truck Rest Area – Kaeng Khoi (Arrival)	Open to public in 2019







In the fiscal year of 2018, 6 projects were initiated including Weigh Station Construction Project and Truck Rest Area as the following

No.	List(s)	Status
1	Weigh Station construction project - Nong Khai Border	Open to public in 2019
2	Weigh Station construction project - Surin (Truck Rest Area is still under construction)	Open to public in 2019
3	Weigh Station construction project - Maha Sarakham	Open to public in 2019
4	Weigh Station Maintenance project - Sikhio	Expected to complete in January, 2020
5	Truck Rest Area construction project - Buriram	Expected to complete in January, 2020
6	Truck Rest Area construction project - Khon Kaen	Expected to complete in January, 2020

In the fiscal year of 2019, 7 projects were initiated including Weigh Station Construction Project and Truck Rest Area as the following

No.	List(s)	Status
1	Weigh Station Maintenance project - Wang Nam Khiao, Nakhon Ratchasima	Expected to complete in November, 2019
2	Truck Rest Area construction project - Surin	Expected to complete in November, 2020
3	Truck Rest Area construction and Weigh Station maintenance project - Tha Sae, Chumphon	Expected to complete in February, 2021
4	Truck Rest Area construction and Weigh Station maintenance project - Ubon Ratchathani	Expected to complete in October, 2020
5	Truck Rest Area construction and Weigh Station maintenance project - Nakhon Sawan	Expected to complete in November, 2020
6	Truck Rest Area construction and Weigh Station maintenance project - Udon Thani	Expected to complete in March, 2021
7	Truck Rest Area construction and Weigh Station maintenance project - Phetchabun	Expected to complete in March, 2021

4. Law Amendment Progress Report.

The Department of Highways by the Office of Traffic Weight Control has collaborated with Mahidol University and Chulalongkorn University to research on overweight trucks and its enforcement to law violators. This collaboration aims to study the benefits and drawbacks of existing enforcement against overweight trucks from other counties to initiate new regulations or to adapt existing regulations to the concerns mentioned which is one of the policy measures of the ministry of transport. The involvement of the private and public sectors is still currently on process and expected to have an agreement in 2020. The details are as following :

- To identify existing problems and countermeasures of overweight truck violations on highways and find possible solutions from other countries to tackle these issues

- To evaluate the possibility of development and the economic feasibility.

- To find appropriate strategies to maximize the benefits of management systems in order to create proactive policies which must comply with Thailand's national strategy.



5. Issue Report of Sugar cane truck Violations on Highways in 2019/2020.

The meeting of Ministry of transport, The Department of Highways, and Sugarcane Farmer Association was held on 29 August 2019 to ask for cooperation and raise awareness on overweight truck violations on highways which must follow the laws and regulations. There were conclusions as followings;

1. All sugar cane trucks must follow the laws

2. All sugar cane trucks must be on the most left lane of the road and keep distance of 200 metres to other vehicles – Keep moving at low speed

3. All sugar cane trucks must enter weigh station, no exceptions and must collaborate with mobile weigh check units, Spot Check.

4. All sugar cane trucks must have a clearance height as followings

4.1 Fresh sugar cane

Six-wheeled truck must have a maximum clearance height of 2.60 meters from ground level.

Ten-wheeled truck, semi - hauling truck and hauling truck must have a maximum clearance height of 3.00 meters from ground level.

4.2 Burnt sugar cane

Six-wheeled truck must have a maximum clearance height of 2.80 meters from ground level.

Ten-wheeled truck, semi - hauling truck and hauling truck must have a maximum clearance height of 3.20 meters from ground level.

5. Sugar cane shall be arranged appropriately and install safety rope at least 3 positions in order to prevent the risk of road users. On daytime and nighttime, red flags, warning signs, blinkers and road safety tools shall be clearly installed to get attention from road users. There is 7/24 emergency call to report and cooperate for help in case of unexpected situations such as falling sugar cane. The officer will immediately travel to the site to control and inspect the scene.

6. Operation Report of solving problems related to the 40ft high cube container and oversize vehicle permit.

The Land Transport Federation of Thailand (Association) asked for a law amendment related to the 40ft high cube container and oversize vehicle permit. Proposals from the meetings which were held in 30 July, 30 August and 15 October 2019 will be then considered by Minister for Transport as the following details.

Arrest statistics for container trucks by The Department of Highways are shown as follows

- In 2017, 59 vehicles
- In 2018, 121 vehicles
- In 2019, 59 vehicles – Latest Updated in 15 August 2019





1. To collect historical data of an amendment about the limited container truck's height such as Ministerial Regulation NO.4 (B.E.2522) issued under the Land Transport Act, B.E. 2522, Ministerial Regulation NO.9 (B.E.2523) issued under the Land Transport Act, B.E. 2522 and Ministerial Regulation NO.19 (B.E.2550) issued under the Land Transport Act, B.E. 2522.

2. To collect the positions of viaduct which is lower than 4.70 meters. There are 60 positions in 13 provinces – 15 routes – such as Highway No. 4, 11, 12, 22, 31, 32, 35, 101, 113, 212, 213, 223, 227, 305, and 1067.

3. To determine the legal right of access to and use of highways by charging road maintenance fees.

4. To collect data and issues regarding the 40ft high cube container and oversize vehicle in relevant public parties such as Department of Land Transport, Department of Rural Roads, The Office of Transport and Traffic Policy and Planning, Port Authority of Thailand, Royal Thai Police, Highway Police Division and The Land Transport Federation of Thailand (Association). This information is then considered by committees.

Environment and Public Involvement



Highway No.304 Amphoe Kabinburi – Amphoe Pakthongchai (Wildlife Corridor)

Department of Highways focuses on sustainable highway development by protecting the qualities of surrounding environment. We operate according to the mandated laws, regulations, and relevant environmental and social policies.







Combatting the PM2.5 crisis

DOH's actions to mitigate the impacts of particulate matter smaller than 2.5 microns (PM2.5) follow the priority policies of the Ministry of Transport to combat the PM2.5 situation. The ministry targets at sources from the transport sector focusing on trucks and public buses via tightening on vehicle condition check and enforcing the laws. As for the DOH, the relevant PM2.5 mitigation measures include:

- The Office of Environment and Public Involvement monitored roadside PM2.5 concentrations for stations by the main road with heavy traffic. Technical recommendations were made regarding the installation of the high-pressure water systems to alleviate the PM2.5 situation. DOH installed the high-pressure water systems at 15 sites, including 11 sites of the Intercity Motorway Division, 2 sites belonging to the Bangkok Highway District, and 2 sites of the Thonburi Highway District.





• The Office of Environment and Public Involvement took part in the subcommittee for monitoring the implementation of the national action plan for "Combatting the particulate matter pollution problems"



• The Office of Environment and Public Involvement setup the LINE group "PM2.5 DOH" as a platform for submitting information of implementing PM2.5 mitigation measures by each unit under the DOH on the quarterly basis. The information will then be compiled and submitted to the Pollution Control Department for publicizing. This activity has been ongoing since 29 October 2019.

• The Office of Environment and Public Involvement submits photographs of the high-pressure water systems implemented on the main highways and toll areas of the motorways via the PM2.5 BANGKOK LINE group on a daily basis and compiled on a quarterly basis to be presented to the cabinet. This activity has been ongoing since 8 November 2019.

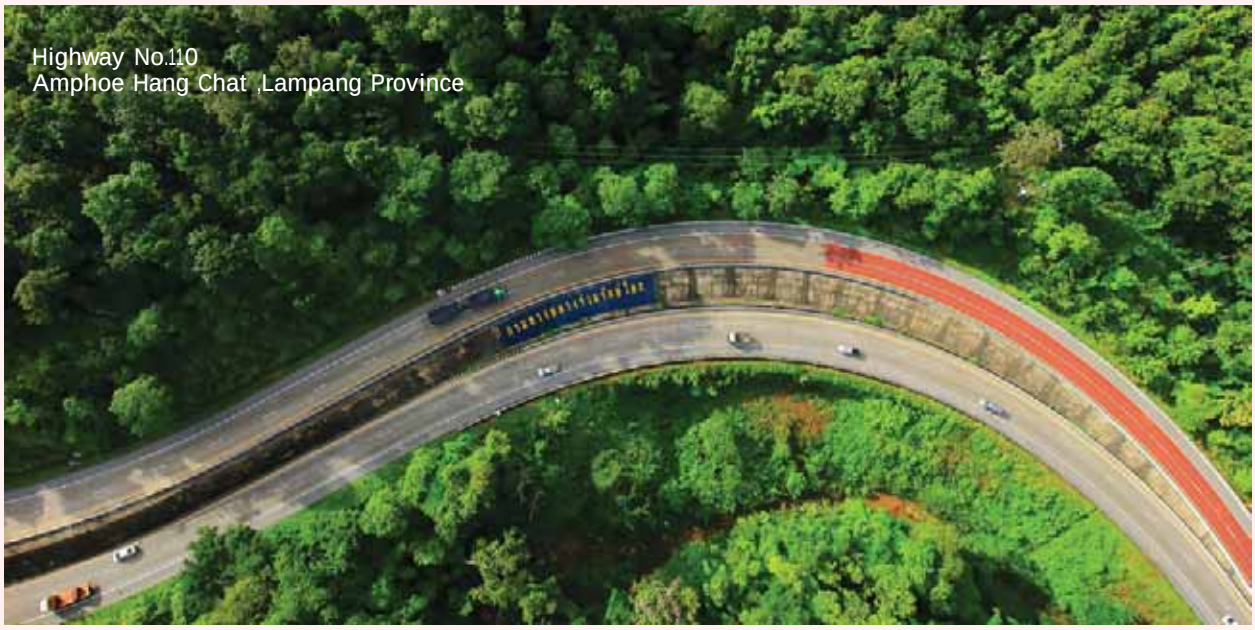
Facilitating highway development corresponding to environmental laws

Our emphasis on environmental conservation and minimizing social impacts from highway development helps promote pre-project preparedness according to the relevant laws and regulations. Our operations include:

1) Conducting environmental impact assessment (EIA) studies to set environmental and social impact mitigation measures. This follows the Article 48 and 49 under the National Environmental Quality Act (No.2) B.E.2561. In the last year, DOH carried out 14 EIA studies.

2) Conducting initial environmental examination (IEE) to set environmental and social impact mitigation measures for projects according to the Cabinet Resolution dated 26 April 2011 titled "Revision of types and sizes of state projects that requires the submission of environmental impact assessment reports following the cabinet resolution about additional conservation forests (13 September 1994). Last year DOH conducted 1 IEE study.

3) Conducting environmental quality monitoring to abide by the Article 51/5 of the National Environmental Quality Act (No.2) B.E.2561 that stipulates the reporting of EIA's environmental impact mitigation measures implementation result. Monitoring activities also aim to comply with the Article 101/2 that sets penalties for failure to submit the monitoring report. During the last year, the DOH conducted 13 monitoring projects.


Highway No.110
Amphoe Hang Chat ,Lampang Province

Promoting public participation throughout highway development

DOH carries out public participation activities throughout the highway development cycle to promote involvement from the public, especially for the construction stage, by following the Announcement of the Office of Prime Minister on Public Consultation B.E. 2548. This ensures that concerns from stakeholders are considered so that each project corresponds with the demand of the local people. In the last year, a total of 159 construction projects carried out public participation.

1) Highway upgrade and efficiency improvement activities, 49 projects


Highway upgrade for Highway 1336 Section Ban Fon – Lampang Highway Construction Center between station km. 7+250 – km. 11+100 by Lampang District Office 1

2) Highway improvement in community areas, 40 projects.


Highway improvement in community area on Highway 1065 Section Phran Kratai - Nong Kula between station km. 9+425 – km.10+200 by Phitsanulok District Office 1

3) New highway projects allocated with B.E.2562 fiscal budget, 70 projects


Construction of Highway 348 Section Pakham district - Nang Rong district between section km.112+000 – km.117+025 and km.118+541 – km.140+141 by Buriram District Office

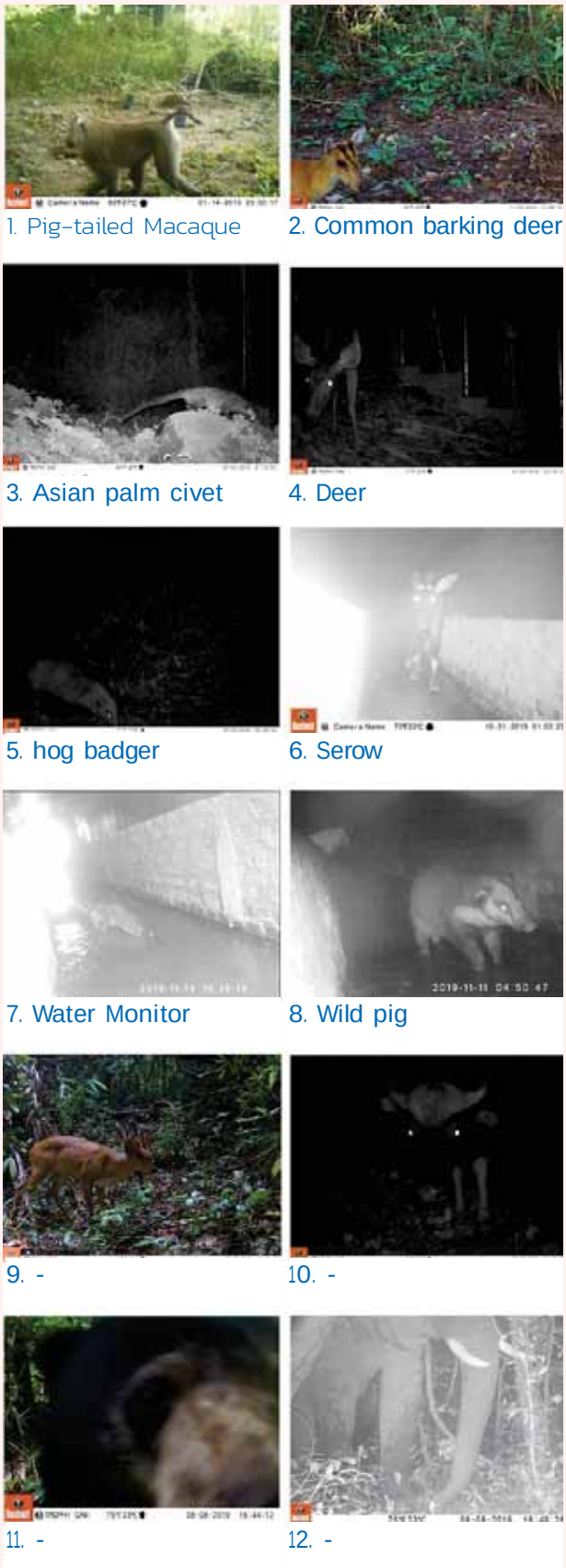
Thailand's First Wildlife Corridor

The wildlife corridor construction project on Highway 304 section Kabinburi district – Pakthongchai district and The 4-lane Widening of Highway 304 section Kabinburi district – Pakthongchai district

DOH appreciates the importance of natural resources surrounding the highway therefore we carried out the wildlife corridor construction on Highway 304 for bridging the World Heritage Dong Phayayen - Khaoyai Forest Complex. The corridor connects ecosystems between Thaplan National Park and Khao Yai National Park. As the wildlife corridor construction between km. 191+860 and km. 195+360 and at km. 207 were completed in January 2019, we continuously monitored wildlife through various means, i.e. camera trap, ground survey, at various spots, such as wildlife crossing structures and animal routes inside the national parks. Preliminary results show positive signs that wild animals started to use the constructed crossing structures. The observed frequency was higher than anticipated from the projection in the EIA study. Early results indicate encouraging trend for effectiveness of the wildlife corridor. Our first success will symbolize our commitment to develop environmental friendly highway in the future.



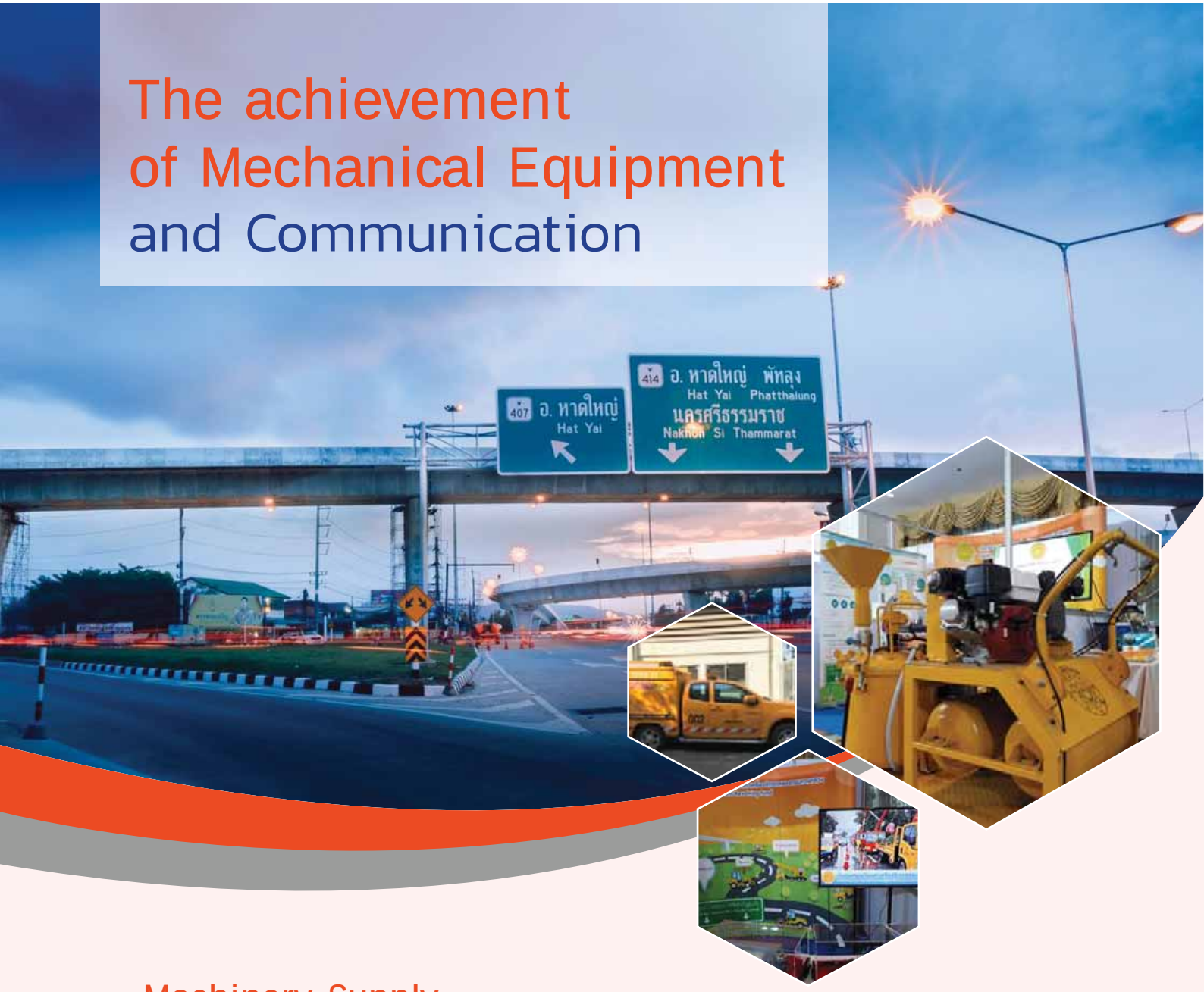
Animal footprints: footprints of gaur (left) and common barking dear (right) observed under the elevated highway at station km. 207



1. Pig-tailed Macaque
2. Common barking deer
3. Asian palm civet
4. Deer
5. hog badger
6. Serow
7. Water Monitor
8. Wild pig
9. -
10. -
11. -
12. -

Camera trap at: 1:under viaduct km.193; 2:near Pa Jampee shop; 3-5:atop tunnels; 6-8:small animal underpass; 9-12: near Sub Bon creek

The achievement of Mechanical Equipment and Communication



Machinery Supply

Department of Highways applies the Equipment Revolving Fund system in equipment management for road construction and maintenance. The system consists of 4 main missions which are equipment supplying, renting, maintenance, and remembering machinery units. The equipment supply concerns the necessity, condition, lifetime, worthiness to repair and investment of the equipment including the suitability to use in the working area. In fiscal year 2019, there are 16 equipment supplies with 2,927 items under the budget of 668.49 million baht. The machinery are tractors crawler type with at least 200 horsepower, automatic compaction equipment with at least 10 tons, hydraulic excavators crawler type with at least 50 horsepower etc.



tractors crawler type with at least 200 horsepower (Code 63-02)

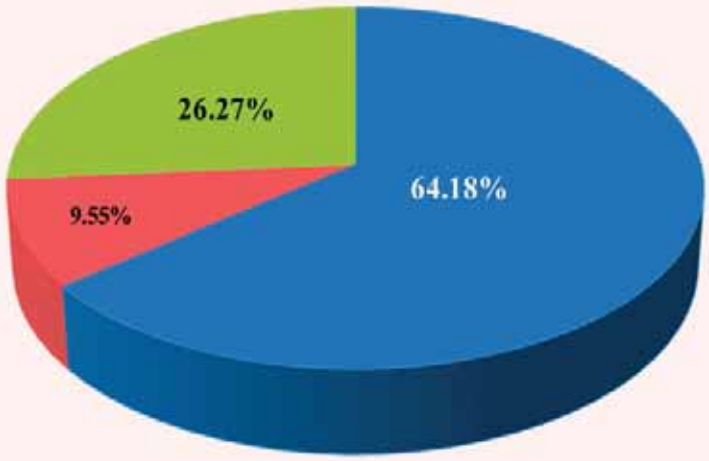


automatic compaction equipment
with at least 10 tons (Code 35-01)



hydraulic excavators crawler type with at least 50 horsepower (Code 82-6)

Apparently, Equipment Revolving Fund has equipment to support mission of the department 13,566 items. It can be classified according to lifetime as follow;



- Equipment in the standard lifetime
- Equipment in 1-1.5 times of its lifetime.
- Equipment in more than 1.5 times of its lifetime

Landscape Improvement and Highway Architecture



The landscape improvement of highway no.4 controlled section 1303 Section Nanode – Huaysai between km.1183+127.87 – km1183+334.10 project Patalung highway district

Project's Background

Formerly, the project's area is free space along the highway no. 4 which occurs from the construction of the new road diversion from the former route in order to avoid the dangerous curve called Haurung curve and the new route can respond to safer use of the users. The old route was changed to be the subordinate route for entering the village only.

Project's Details

The project is located between Patalung and Hatyai. It is high traffic volume area as it is a main route for many provinces in upper and middle southern parts either Andaman and Thai gulf coasts. This route headed to main economic cities in the south and cross border to neighboring countries. The project are reflect the characteristic of the south such as Classical Thai Tune (Manohra) and Thai Shadow Play (Nhang-Ta-Lung) which are ancient local entertainment and can well reflect the uniqueness of the south and Pattalung province.

Project's Benefit

1. Create the new landmark on the route and provide rest area for the users to relax and take photo.

2. Be the public park for leisure of the people in the community.

3. Propagate uniqueness of the local culture to the outsiders in order to know and appreciate in wide range.









Highway no.3310 controlled section 0100 Section Kratumlom – Phutthamonthon between km.9+400 landscape improvement Project Samut Sakhon highway district



Project's Background

This project improved free space of intersection of highway no.338 and highway no. 3310 to be green zone. The project area is close to Phutthamonthon where the Bhuddism ceremony occurs and also the big public park that people can use for their leisure.

Project's Benefits

1. Using free space to be good use and increase green zone for highway and create the land mark for highway's users.

Project's Details

The project's area is the desolate free space and it is the area along both sides of highway no.338 which is the linkage between Bangkok to Nakhon Pathom. The idea of landscape improvement is to create the scenic landscape on both sides of the highway for users and the wheel of life statue in order to be a landmark of Phutthamonthon where the important area of Buddhism is.







The Highway no.21 controlled section 0101 Section Sikhio Intersection – Hin Khong km 0+000 landscape improvement Project Nakhon Ratchasima highway district 2

Project's Background

This project is located in Sikhio Intersection so the users always use it as a rest area. The former area is the desolate space and it is not safe for being rest area. Therefore, it was designed and improved to be a rest area which is safe, beautiful and benefit to the users.

Project's Details

It is a rest area that supports the users who enter the eastern part especially during the festive season that there are numbers of users. Therefore, the project area was designed the public service building with the toilets, public rest house and wide parking areas. Besides, there are also the public park with the perennials plant for the shade and flowering plant to create the color for the project's area.

Project's Benefits

1. Be the rest area for highway users and people in nearby community

2. Improve the desolate area to be beautiful and safe area Create green zone and support the good image of the department.









Responsibility of Highway Police Division



The Highway Police Division was established on 30 August 1960 by the resolution of the cabinet and was announced on the Royal Decree of Public Administration, Department of Police, Public Administration in the same year. The Highway Police Division has been funded by the national budget under the Department of Highways. The Royal Thai Police organizationhad been divided into 3 subdivisions;until 30 June 2005 the major restructuring took place. (There were several reorganizations, before then.) It was renamed the Highway Police Division following the Ministry's regulation on organization classification in the Royal Thai Police 2005. On 1 July 2009 the Royal Decree of Public Administration announced the reconstruction of the Royal Thai Police, and the Highway Police Division has been divided into 1 administrative section, 8 subdivisions and 1 royal safety divisions. Their structures and duties could be described as follows.

1) Organization structure of the Highway Police division comprises 1 administrative section, 8 subdivisions and 1 royal safety section as follows.

1.1 Administrative section has 7 major work responsibilities, including:

1) Administrative and human resource
2) Strategy planning
3) Financial work and budget allocation
4) Material, vehicle and other supportive resource management
5) Law work and legal case management
6) Information technology
7) Information center and communication

1.2 Operation section includes 8 subdivisions; each of which is under supervision of a highway police inspector. Their responsibility areas are described in the following table.

Subdivision	Responsibility Area (City/Province)	Amount of Responsibility Highways (Km.)	Amount of Service Station
Subdivision 1	Ayutthaya, PathumThani, Nonthaburi, Saraburi, Nakhon Nayok, Lopburi, Singburi, AngThong, Nakhon Sawan, Uthai Thani, Chainat, Phetchabun and Phichit	2,799	30
Subdivision 2	NakhonPathom, Suphanburi, SamutSakhon, Phetchaburi, Ratchaburi, Kanchanaburi, Samut Songkhram, Chumphon, Ranong, Prachuap Khiri Khan and SuratThani	2,195	37
Subdivision 3	Chachoengsao, SamutPrakan, Chonburi, Rayong, Chanthaburi, Trat, Prachinburi and SaKaeo	1,755.06	19
Subdivision 4	RoiEt, Kalasin, MahaSarakham, KhonKaen, UdonThani, NongKhai, Loei, NongBuaLamphu, SakhonNakhon and NakhonPhanom	5,013	21
Subdivision 5	Tak, KamphaengPhet, Lampang, Phrae, Phitsanulok, Sukhothai, Uttaradit, Chiang Mai, Lamphun, MaeHongSon, Phayao, Chiang Rai and Nan	3,110	28
Subdivision 6	NakhonRatchasima, Buriram, Surin, SiSaket, UbonRatchathani, Amnat Charoen, Mukdahan, Yasothon and Chaiyaphum	3,629	34
Subdivision 7	Songkhla, Phattalung, NakhonSi Thammarat, Trang, Satun, Krabi, PhangNga, Phuket, Pattani, Yala and Narathiwat	2,683	20
Subdivision 8	Inter City Motorway No. 7 and 9	142	12
Total		21,326.06	201

1.3 Royal Safety sections under supervision of a highway police superintendent.

2. Duties and Responsibility of Highway Police Division

2.1 Be responsible for the safety of the H.M. the King and Queen, Heir to the throne, the royal family, royal representatives and royal visitors.

2.2 Prevent and suppress crime throughout the country.

2.3 Enforce the code of criminal and other violation against the law on highways and motorways all over the country.

2.4 Provide social service, traffic control and management on all highways and motorways.

2.5 Apply traffic laws and regulations on all highways and motorways.

2.6 Support or coordinate with any operation from involving agencies, or as assigned.

3. Mission and Burden of Highway Police Division

3.1 Provide the safety to the H.M. the King and Queen and royal family as the highest responsibility.

3.2 Promote fringe benefits to all highway polices and their families to boost their living quality and work efficiency.

3.3 Encourage learning society, working expertise and ethic to all policemen.

3.4 Improve the information technology (IT) system to help promote travel convenience and safety, and good transport on roads. This improvement also results in the development of more efficient and modern organization management system, which in turn leads to faster and better public service.

3.5 Prevent and suppress all crime and any act against the law on highways. Monitor and maintain all assets on highways to be in a good condition.

3.6 Foster a good aspect of highway police to the public.

4. Workforce

The total manpower of the Highway Police Division is 2,237 which comprise 307 commissioned level polices and 1,930 non commissioned level polices.

5. Vehicle

The Highway Police Division owns totally 1,232 vehicles.

6. Budget

The Highway Police Division was allocated 519,715,200 baht from the national budget under the Department of Highway's quota in the fiscal year 2019.

7. Accident Prevention, Traffic Control and Management

The Highway Police Division is responsible for traffic control and management, accident prevention and any public services on highways throughout the country. The detail could be described as follows.

7.1) Provide action plans of traffic control and management, accident prevention and any public services during festivals such as,

- Campaign to facilitate traffic, prevent and reduce accidents on highway during the New Year festival
- Campaign to prevent and reduce road accidents during Songkran festival
- Safe highway project

7.2) Provide traffic management plan during the flooding period to facilitate road users and prevent road accidents. Prevent and suppress any crime not only during the flooding period, but also after the crisis.

7.3) Monitor and arrest all traffic law violators such as overloaded cars, exceeding traffic speed and drunk driver. Protect highway properties and monitor highway deterioration to ease highway maintenance budget and improve highway network efficiency.

7.4) Facilitate traffic, provide convenience and safety to road users during festivals such as New Year and SongKran festivals. The highway police division provides service to road users by opening the call center 1193 and using the Highway Police Application called "Highway Police (Thailand) By IAppDev.com". These together would ease road users to connect with the police and get their service, when an accident takes place. The road users just select main features from the program such as highway police offices' locations and details, insurance companies' details, hospitals and car towing service, and immediately everything automatically report to the police.

Highway Police's manpower

Highway Police's manpower		
Rank	appointee	vacancy
Commissioned Officers (307)	259	18



Highway Police's manpower		
Rank	appointee	vacancy
Non-Commissioned (1930)	1723	203



Legal Work



Developing inter-city motorway or motorway is an important mission that the Department of Highways intends to develop a route in order to get more convenient, fast and safety to be the main network of travelling and road transportation. The Department of Highways provides fee payment service through automatic card, namely M-PASS to reduce heavy traffic at the tollgate and increase toll-way passengers 'convenience on the Intercity Motorway no. 7 (Bangkok-Chonburi), and motorway no. 9 (Bang pa-in - Bangna) on M-PASS card system. Passengers will receive an M-PASS card, an M-PASS box and a systematic instruction manual. M-PASS is used for cars with no more than 4 wheels and a height of no more than 3.2 meters and must be used in the specified lane. It is free when applicant makes the first top-up of 1,000 baht/card. However, minimum top-up pre transaction is 500 baht and increases in sequence of 500 baht. In the contrary, maximum of 5,000 baht per time and the maximum reserve limit is not more than 10,000 baht per card. The fee payment system will automatically cut through the car. For fee payment, the box and reserves the money on the card in the designated channel provided in order to reduce traffic in front of the checkpoint and increase the convenience of the road users

Nowadays, there are very few users in the automatic collection system, therefore, it is considered as one of the factors to consider that this service system has not yet been popular. Due to the limitation of top-up when applying for the service, users must reserve money on the card, which may be seen as quite high amount.

The Department of Highways has therefore adjusted the method of top-up in the M-PASS system, such as; the initial application fee is 300 baht. The next top-up is at least 100 baht, with a maximum of 5,000 baht per time and a reserve limit of not more than 10,000 baht. Per card

The Bureau of Law, DOH, therefore, sets up the Ministerial Regulations regarding the criteria of fee payment via automatic cards on Motorway no. 7 (Bangkok-Chonburi), and motorway no. 9 (Bang pa-in - Bangna), announced on 8 November 2019 for propriety and attracts major attention using the fee payment service through automatic card system.

Public Relations and Dissemination



The Public Relations Section plays an important role in supporting and promoting the effectiveness of the Department of Highways (DOH) operations. Public Relations links DOH to the public by broadcasting the information of DOH, establishing good relationship among DOH sectors and the public, and promoting public cooperation via mass media.

In 2019, The Public Relations Section has publicized and disseminated the activities of the DOH as follows.



1. Television broadcasting

DOH has disseminated its activities through television broadcasting as Highlight Highways and Saradee Song Natee Highway News which is broadcasted on the Amarin TV (34 HD), and a miscellaneous documentary program on Nation TV, also Chao Nee Prathet Thai which is publicized DOH's works on Royal Thai Army Radio and Television Channel 5.

2. Radio broadcasting

The purpose of this activity is to inform events and projects of DOH according to its missions and strategies. The program is broadcasted by the Radio Thailand, Department of Public Relations and other radio stations such as Jor Sor 100 MHz, Sor Wor Por 91 MHz and FM 91.0 MHz.

3. Publications

DOH has continually disseminated its activities through daily and weekly newspapers, magazines, pamphlets, "Tang Luang Sam Pan" journals and the DOH annual report.







5. Press conferences

DOH makes statements through press conferences for many events such as the important projects of DOH in 2019 and the clarification of facts as the government policy by using IA-IRChat.

6. Multimedia and Exhibitions

DOH has produced publications and multimedia related to the work of DOH, Ministry of Transport, and other organizations through various kinds of channels such as billboard, exhibitions and picture gallery.

7. Special Occasion Activities

The DOH has organized the important activities such as the Side Ditch Lining along Viphavadee Road Projects to join the activity commemorating the auspicious occasion of His Majesty the King's coronation, publishing the Commemorative book on the Official Inauguration of the Second Thailand – Myanmar Friendship Bridge Crossing the Moei/Thaungyin River, ceremonies of motorcycle caravans, rescue and police patrol vehicles in order to provide convenience and safety during New Year and Songkran festivals, the opening ceremony of Highways 304 Kabinburi – Pakthongchai (Wildlife Overpass), the opening ceremony of Highways 4021, 4024, 4028 with Thetsabal Road underpass, Phuket and the Ceremony Marking the Completion of the Thailand - Cambodia Friendship Bridge (Ban Nong Ian - Stung Bot), Aranyaprathet, Sa Kaeo. Moreover, there is a workshop on Public Relations Network to improve the PR skill and performance.

Information Technology



Data Standardization and Data Integration Project

Data standardization of the Department of Highways as specified in this project is the initial operational stage compared to the initiative defining various mechanisms in overseeing the Department of Highways' concrete data for the purpose of data management as well as data-sharing utilization of the information system within the Department of Highways. It is also the starting point for connecting data exchanging of the information system between the Department of Highways and other government agencies, which is a policy response to the government data integration. The result of the project consists of implementation results of data standardization for the Department of Highways, implementation result of data standardization storage system and data standard registration, and implementation result of the data integration system.

1. The importance of Data Standardization

In the fiscal year of 2017, the Department of Highways began to establish the Department of Highways data standards, however, as the Department of Highways has an administrative structure agency in both central and regional part of the country, there are numbers of data dimensions, multiple data groups, and also implementation of data standardization requires a period of time to analyse an architecture of information system, a current character of data exchanging between information system including the demand for data utilization form the information systems, providing data from the information system between both internal and external organization, reduce data redundancy, define the data format, etc. These, therefore, requires some time to operate and review in order to achieve the standardization of the Department of Highways data following with the objectives and goals of the project, the implementation is divided into 4 phases as planned as follows:

- Phase 1 is to start setting the data standard of the bureau that originated data according to the main tasks of the Department of Highways, i.e. Bureau of Planning, Bureau of Highways Maintenance Management, Bureau of Highway Safety, Bureau of Mechanical Equipment and Communications, Office of Inter-City Motorway Division, other bureaus will proceed in the next phase.
- Phase 2 is the data standardization and data integration to support big data including data standardizing, registration system, and data standardization along with registration system and data standard storage, development of data integration system, data analytics and business intelligence. This phase will study the status of the information system and database of the Department of Highways increasingly and continuously from Phase 1, i.e. Bureau of Bridge Construction, Bureau of Standards and Evaluation, Bureau of Material, Analysis and Inspection, Inter-City Motorway Division, Personnel Division, and Finance and Accounting Division.
- Phase 3 Implementation of a data standard for enhanced connecting and exchanging by selecting the data which has the second priority level of sharing and considered as the Department's supporting work.
- Phase 4 The results of data standardization in Phase 3 will be set to further develop.

The implementation of data standardization for exchanging, apart from determination multi-dimension of data standardization such as, standardized data codes, standard data set, standard document, and data description standard, there are necessary important components needed, for example, data standards regulatory agencies, standardized data registration to be a principle for standardization determination in various contexts, rules for creating data in accordance with standards, a group of people who shared the use of information systems, creating supporting and using data standards tools along with help producing the connectivity and exchanging data between agencies. This could be summarized as follows;

1) It enhances the efficiency of data collaboration, reducing the burden of administrators if data is needed to be exchanged.

2) It reduces the cost of equipment purchasing or tools if sharing information is required but the features of the server are different.

3) It helps shorten the time for the development of information systems if it is needed to be shared.

4) It helps increase the chances of success of the project for data exchanging between internal and external organization.

5) It helps reduce the impact of data sharing when data details have been changed.

2. Key concepts and methods for standardizing data from the Department of Highways

In implementing data standardization of the Department of Highways, the guidance of TH e-GIF has been applied to develop items as shown in Figure 1.



[1] Data from the data standardization manual for data connection between the government and agencies.

The automatic connection and exchanging of electronic information between the different information systems shall follow these procedures.

2.1) Determine a central standard for specifying dictionary entry names for document consistency.

2.2) Determine the data structure standard for electronic documents which must be exchanged

2.3) Determine technical standards for connecting, exchanging, and working together

2.4) Management, improvement, and supervision of the standard implementation.

Data standardization determination that creates consistency and reduces data duplication shall start from a study of the process and operational procedures as an overview of agencies that desire to integrate information systems and simulating the results from the study to be in the form of a diagram (Business Process Modeling), these will help create a document model and system analysis to summarize a list of all documents in paper form and electronic format in related to those processes being considered. Once all relevant documents have been collected, all the dictionary entry name will be compiled in for comparative analysis, review the meaning and data characteristics of each list clearly, consider the similarities and differences and connect the relationships between related data lists, reduce redundant dictionary entry name, especially those that appear in multiple documents but different names. The aforementioned actions shall be prioritized and considered for correctness and appropriateness and find conclusions with the relevant agencies carefully for the purpose of determining the dictionary entry name and the meaning, which is clear as corresponding standards and shared understanding between agencies, users and service recipients.

3. Analytical study for connecting and exchanging data of internal and external agencies of the Department of Highways.

According to the survey of the status of data exchanging between information systems within the Department of Highways as mentioned above, we found that the information systems of all 5 surveyed agencies have a total of 70 systems, in which some systems are sharing data.

In the analysis of the status of the connection and exchanging data between information systems, in addition to the information exchanging study between the information systems within the Department of Highways, has also conducted a study to analyze the status of data exchanging between the information systems of the Department of Highways and other external agencies such as; the Ministry of Transport, the Digital Government Development Agency (Public Organization) and the Open Data by using interviews from representatives within the Department of Highways and the information study from the of the Department of Highways website, the Ministry of Transport website, and the website of the Digital Government Development Agency (Public Organization). As mentioned by the data analyzed, it can be summarized the status of data exchanging between the information system of both internal and external agencies of the Department of Highways as indicated in Figure 2.

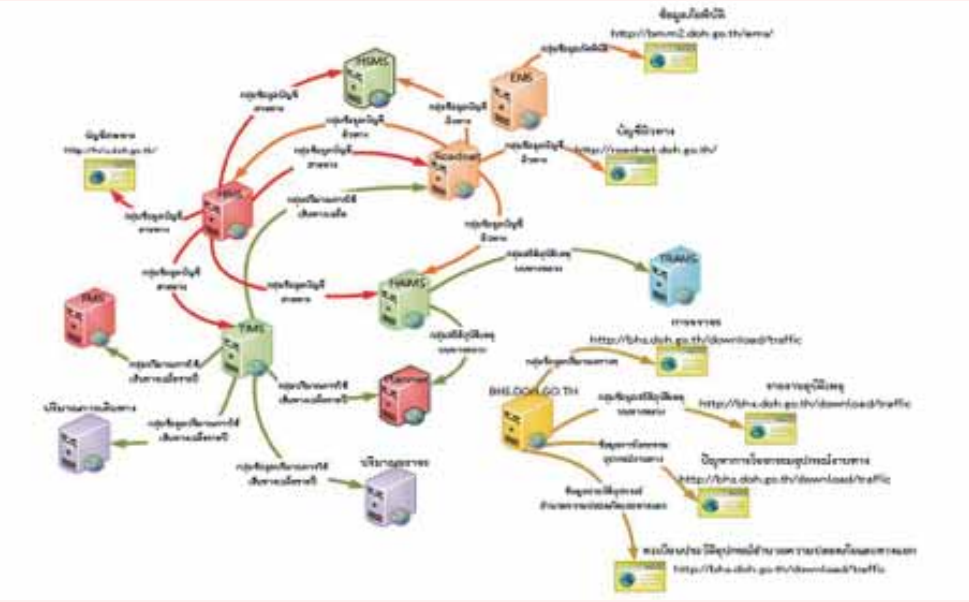


Figure 2: Status of data exchanging between current information systems

In addition to data exchanging between information systems, the internal agencies of the Department of Highways also require data from the information systems of other agencies. There are numbers of other data set which the internal agencies of the Department of Highways require to use but still unable to connect and exchange information via automated information systems because of many reasons as classified before, the demand could be summarized as in Figure 3.



Figure 3: The results of analysis of requirement to use data within and outside the Department of Highways.



The data flow process can be described as follows

On the basis of the data flow process, it could be able to analyze the data set to be defined as the data standard as mentioned above, therefore, there is a guideline for defining dictionary entry name and data modeling by referencing the CCTS (Core Components Technical Specification) as specified by the TH e-GIF standard in response to data connection between information systems which have the same or different data exchange model in order to define data structures, electronic documents. This process has complied with the ISO 15000-5 standards for technical practices for the determination of common data sets.

Data analysis could be divided into 2 types which are; the specific data of each agency and collective data between agencies. In this case, various agencies have been selected i.e. the Planning Bureau, the Highways Management and Maintenance Bureau, the Mechanical Equipment and Communications Bureau, Office of Inter-City Motorway Division agreed to determine the definition of data in which the definition of the selected data will be regarded as the data standard and the remaining bureau shall adjust the data definition as well as the format of the data in order to match the new standards obtained from consensus.

4. Implementation of data exchanging standard between internal and external information systems

With a view to connect and exchange data through the information system in conformity with the specified data standards, therefore, the said data standard has to be determined to be an electronic document format standard which is a document format created specifically for data exchanging. TH e-GIF has set the XML language as a standard for determining the structure of electronic documents used for exchanging data. It is defined in XML Schema and in keeping with Thailand E-Government Interoperability Framework Version 2.0. This has defined in both inbound and outbound data sets from the information integration system described as the same standard structure and shaped the data linking via the Web Service, as in Figure 5.

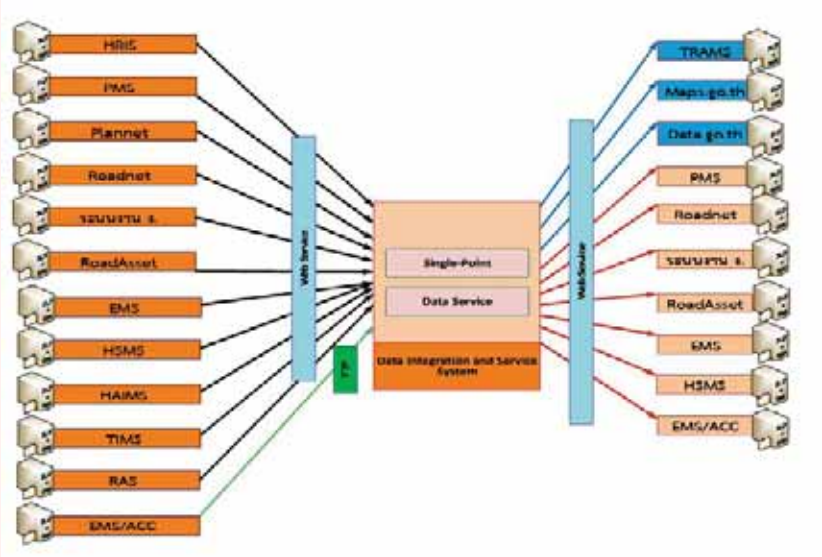


Figure 5 Overview of data linkage between the information system of the Department of Highways and the integrated system

Symbols definition

The data linking between the information system of the Department of Highways require to gain the standards in exchanging information, to be used or forwarded to other information systems within the Department of the Highways conveniently, efficiency, and able to inspect the accuracy and completeness of information, as a result of the information is stored and forwarded in the same format throughout the system. The standards for exchanging the said data could be classified into 2 main groups; the standards for data exchanging between the information system within the Department of Highways and standards for data exchanging between the information system of the Department of Highways and other agencies. The results of the said project from the report of data analysis and the need for data sharing through the Department of Highways information system, therefore proceeding to define as a data standard of 10 sets as follows;

1) Vehicle routing data Sets
2) Average annual traffic usage data set
3) Maintenance plan data set
4) Accident statistics data set
5) Asset data set on the right of way areas
6) Asset data sets outside the right of way area
7) Disaster data set
8) Amount of vehicles passing through the toll data set
9) Mechanical rental rates data set
10) Safety equipment data set

In cast that it has to consider the electronic data exchange standards illustrated in the XML Schema, the data standard could be retrieved from "Standardized data storage and data standardization system" by dividing system users into 2 types;



- The Department of Highways Officials could access the system through URL: http://sdms.doh.go.th/DOH-SDM-WEBUI
- External user and general public could access the system through URL:http://sdms.doh.go.th/DOH-SDM-WEBUI/Content_StandardData/StandardData_I.xhtml

5. Implementation of integrated data system of the Department of Highways

The data integration system has objectives to provide information services between the information system both within and outside the

organization by applying appropriate technology consistent with current and future technology trends. There is a design that takes into account of the importance of data management, reducing data redundancy and the data has been selected essentially and appropriate for data integration. The data integration system shall be the processor based on the data standards confine by the Department of Highways, the work process could be divided into 4 main processes as follows;

Process 1: is the preparation of data from various system which has been selected by carrying out the said data to be collected at the linking system and providing data services

Process 2: is the process of receiving-sending data and connecting between the working systems. When the system connected and provided information services between information systems for both internal and external organization and the data from various systems according to process 1 has been received, the connecting system and providing information services between information systems for both internal and external organization will deliver the data to the integrated server regarding to schedule.

Process 3: System Integration, when the integrated system receives data from connecting system and providing information services between information systems for both internal and external organization will collect the data as original copy before being processed. Data obtained after processing will be processed according to specifications to create summary information.

Process 4: Information Management, when the data is processed after confirming the import procedure, the integrated system will display data management channels as a man to allow other systems that desire to take and use the data via the Web Service or FTP as agreed. The mentioned procedure supports both internal and external the Departments of Highways or the general public, the person who accesses the internal information should receive a Username and Password in order to check the access rights. However, for information published for general public could access the information instantly.



Figure 6 The architecture of
the data integration system

Data integration system has designed a form of working schedules of various data processing for the connection and providing data service between information systems for both internal and external organization, which has a working schedule on a daily basis (shall be processed from Monday - Friday) and monthly (shall be processed, for example, in every 1st or every 16th or the end of the month). The operation of the data integration system is based on the architecture called Service Oriented Architecture or SOA, which is a service-oriented architecture with a concept in system design or software of the organization in a service-oriented manner. The

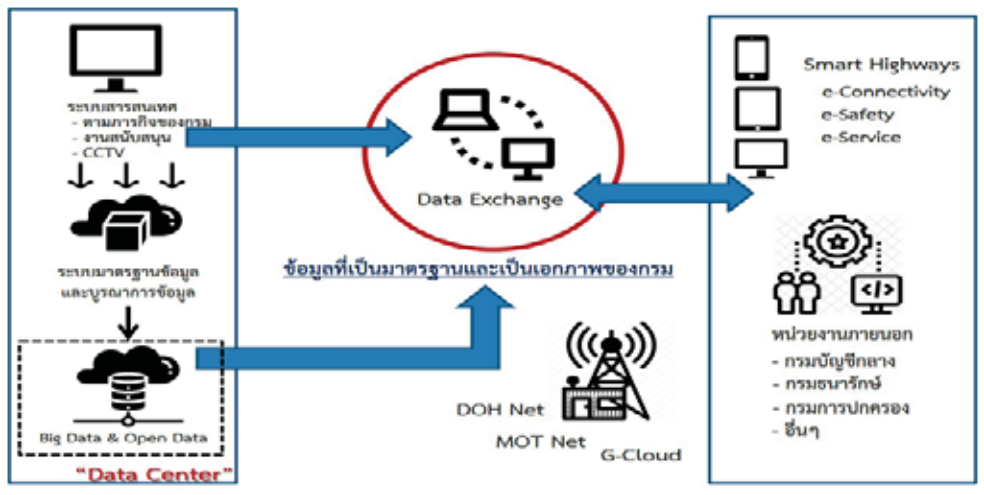
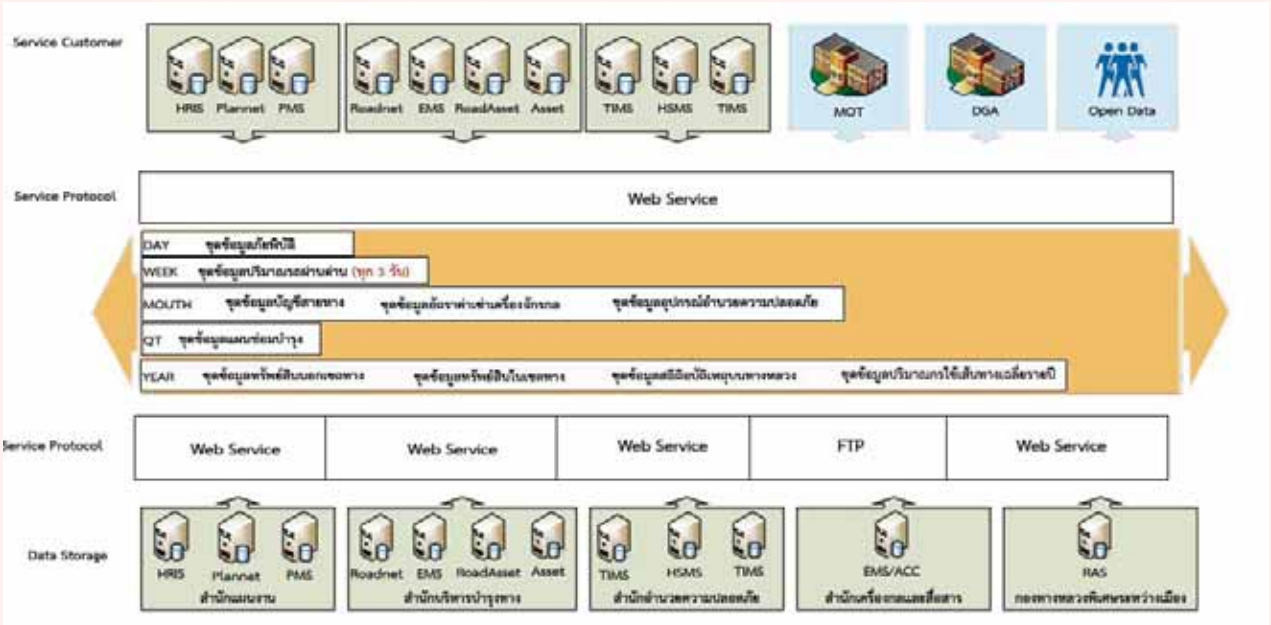


Figure 7 Data linking between the information system of the Department of Highways and agencies that desire to use the data from the data integration system

services have functionalities that define a clear scope focusing on making the most of existing information by enabling diverse and complex resources to work together. The services of the developed software could communicate with generally accepted standards. The logic is in the form of Service and provides other for the service as well. Each service being independent and able to communicate with each other both within and outside organization, which led to connect to data through existing technology without the need of developing entirelyIn the occasion, which desires the management and supervision of the data to be in a good standard, the Department of Highways should consider the enforcement of data standards by establishing policies and regulations for all agencies of the Department of Highways to use data according to the standards as specified as well as intend to review the data standards to be up-to-date and conducting data standardization including continue to integrate data to cover all data lists of the Department of Highways as to go forward to provide services in the form of Open Data and Big Data of the government in the future.



Activities on the occasion of the Royal Coronation Ceremony





















Department of Highways helped people who effect from Tropical Storm Podul.



















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Produced by : Office of the Secretary , Public Relations Subdivision , Department of Highways
2/486 Sri Ayudhaya Road, Ratchathavi, Bangkok 10400
Tel. (662) 354-6530

Website : www.doh.go.th

Published by : TTP INNOVATION CO., LTD.
Ramkhamhaeng Soi 110 ,Ramkhamhaeng Rd,Saphan Sung, Bangkok 10240
Tel. (662) 373-3805



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