



His Majesty King Maha Vajiralongkorn Bodindradebayavarangkun's Remarks Given to Civil Servants on the Occasion of the Civil Servant's Day, 1 April 2020

There are 3 elements of knowledge regarding to perform the civil work; righteous, accurate, profound and extensive knowledge, skillful knowledge and rational, and subjective and integrity knowledge.

All civil servants should assemble these 3 elements of knowledge which will accomplish goodness and prosperity to country and people.



Preface

Over the past 109 years, Department of Highways is the organization that develops infrastructure, connects land, water, air, and railway transportation network system, supports the country in steering economy, society, culture, technology, including security through highway network connection of 1,531 routes which is totally 52,083 kilometers. Presently, Thailand has already had complete highway network throughout the country. Department of Highways is aware of the great mission to work for the utmost benefits of people following the government's policy and vision of the department which aims to provide "convenient and safe highway system to connect the infrastructure development of the country"

At present, Department of Highways has worked on various important projects as the motorway No.6 (Bang Pa-in – Nakhon Ratchasima) covers the distance of 196 kilometers, the motorway no.81 (Bangyai-Kanchanaburi) covers the distance of 96 kilometers, the overpass on highway no.35 (Thonburi-Pakthor), the 5th Thailand-Lao PDR friendship bridge construction (Buengkan-Bolikhamsai), the side ditches development on Vibhavadi Rangsit road section 2, the highway constructions, the main highway expansion to 4 lanes, the traffic problem solving in Bangkok, perimeter and main city, the international highway construction, the overpass bridge construction across the railway, the projects to support the Eastern Economic Corridor (EEC) etc. All projects aim to support the strategy of the department as well as the country.

Apart from the construction projects, Department of Highways also has the responsibility for highway maintenance for efficient usage. As the mission of the department is providing safety for the highway users, the department is ready to achieve that goal; people must receive the convenience, rapidity, and safety in travelling. Besides, there are many missions as Department of Highways – Provincial Waterworks Authority fight draught project, Decreasing and preventing PM 2.5 project, the tourist service area construction in highway depots in Chiang Mai, Phetchabun, and Trang provinces, Flood Relief Operation in many areas. Moreover, highway innovation is another responsibility in order to facilitate the convenience and safety for people such as M flow: the new smart toll collection system which helps solving traffic problem on motorway, decreasing traffic volume in toll station, uses rubber for increasing road safety and this also helps farmers who plant the rubber tree.

All works of Department of Highways has been achieved by all staff who works for people over 109 years in order to develop country, connect society, facilitate economy, helps people gaining convenient, rapid, and safe travelling. We, Department of Highways, will be side by side with highway users everyday 24 hours.

Editorial Team

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128 Publication Committee





Motorway No.6
Bang Pa-in – Nakhon Ratchasima



General Prayuth Chan-o-cha

Prime Minister

Minister Of Transport
Deputy Minister



Mr. Saksiam Chidchob
Minister Of Transport



Mr. Thaworn Senniam
Deputy Minister Of Transport



Mr. Atirat Ratanasate
Deputy Minister Of Transport

Permanent Secretary
Deputy Permanent Secretary



Mr. Pisak Jitviriyavasin
Deputy Permanent Secretary



Mr. Chaiwat Tongkamkoon
PERMANENT SECRETARY



Mr. Anon Luangboriboon
Deputy Permanent Secretary



Mr.Peraphon Thawornsupacharoen
Deputy Permanent Secretary

Department of Highways
Executive 2020



Mr. Sarawut Songsivilai
Director General



Mr. Apisit Promasen
Deputy Director General For Maintenance



Mr. Apichart Juntarasup
Deputy Director General For Engineering



Mr. Apirat Chaiwongnoi
Deputy Director General For Operration



Mr. Kittiphan Panchan
Deputy Director General For Administration

Department of Highways
Executive 2020



Mr. Vanchak Chayakul
Chief Engineer for Highway Safety



Mr. Pramon Sathapornnanon
Chief Engineer For Location and Design



Mr. Satitpong Apimeteetamrong
Chief Engineer for Research and Development



Mr. Chatchai Chuangching
Chief Engineer for Maintenance



Mr. Parinya Saensuwan
Chief Engineer for Construction



Mr. Sittichai Boonsaat
Chief Engineer for Planning

Department of Highways
Current Team



Mr. Sarawut Songsivilai
Director General



Mr. Apisit Promasen
Deputy Director General For Maintenance



Mr. Apichart Juntarasup
Deputy Director General For Engineering



Mr. Apirat Chaiwongnoi
Deputy Director General For Operration



Mr. Kittiphan Panchan
Deputy Director General For Administration

Department of Highways
Current Team



Mr. Chatchai Chuangching
Chief Engineer for Maintenance



Mr. Sittichai Boonsaat
Chief Engineer For Location and Design



Mr. Vanchak Chayakul
Chief Engineer for Highway Safety



Mr. Narin Srisompun
Chief Engineer for Planning



Mr. Attasit Sawatparnich
Chief Engineer for Research
and Development

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



Motorway No.9
Bang Pa-in – Bangplee

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
"HIGHWAYS"

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

(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.





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.

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.



Organization Chart, Department of Highways

Director-General

Chief Engineer

- Chief Engineer for Planning
- Chief Engineer for Location and Design
- Chief Engineer for Construction
- Chief Engineer for Maintenance
- Chief Engineer for Research and Development
- Chief Engineer for Highway Safety

Office of Internal Audit

Office of Administrative System Development

Personnel Division

Deputy Director-General for Administration

- Office of the Secretary
- Finance and Accounting Division
- Training Division
- Procurement Division
- Information Technology Center
- Bureau of Legal Affairs
- Inter-City Motorway Division
  - Inter-City Motorway District

Deputy Director-General for Maintenance

- Bureau of Highways Maintenance Management
- Office of Highways 1-18
  - Highway District
- Office of Traffic Weight Control
- Highway Police Division

Deputy Director-General for 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
- Bureau of Bridge Construction
  - Bridge Construction and Rehabilitation Center 1-4

Deputy Director-General for Engineering

- Bureau of Materials Analysis and Inspection
- Bureau of Road Research and Development
- Bureau of Highway Safety
- Bureau of Highway Standard and Evaluation
- Bureau of Planning
- Bureau of Location and Design
- Bureau of International Highway Cooperation

The units that appointed by the DOH

- 5 Road Construction Training Centers are Lampang, Lom Sak, Khon Kaen, Kanchanaburi and Songkhla Road Construction Training Center
- Highway District with international friendship Bridge are Chiang Rai 2, Nakhon Phanom, Nong Khai and Mukdahan Highway District

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 13 November 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 Si Ayutthaya 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



Report on Expenditure Budget of Fiscal Year 2020
Classified under workplan/output/project
(Regular and Capital expenditure)
As of 30 September 2020

Department of Highways, Ministry of Transport

Unit : Baht

workplan/output/project		Budget after transfer or adjustment	Retained Disbursement	%
Total		105,824,209,100.00	83,204,752,585.59	78.63
1. Workplan: Government employee workplan (increasing capacity of competitiveness)		5,067,989,800.00	5,028,673,922.27	99.22
Output 1	Expenditure for government employee in infrastructure and logistic system development	5,067,989,800.00	5,028,673,922.27	99.22
2. Workplan: Basic workplan of increasing capacity of competitiveness		24,663,562,000.00	21,876,692,251.74	88.70
Output 1	Developed highway network	1,405,802,830.00	1,040,331,291.01	74.00
Output 2	Maintained highway network	19,427,897,283.00	17,675,594,094.59	90.98
Output 3	Safety highway network	3,829,861,887.00	3,160,766,866.14	82.53
3. Workplan: Integrated development workplan of Special Economic Zone		3,394,518,204.00	2,738,245,892.26	80.67
Output 1	Highway development project for supporting Special Economic Zone	3,394,518,204.00	2,738,245,892.26	80.67
4. Workplan: Integrated workplan of Eastern Economic Corridor		9,053,126,349.00	8,524,731,632.07	94.16
Output 1	Highway development for supporting Eastern Economic Corridor	9,053,126,349.00	8,524,731,632.07	94.16
5. Workplan: Integrated workplan for development of transport and logistic system		60,935,012,747.00	44,316,433,687.18	72.73
Output 1	Inter-City Motorway Construction Project	10,734,085,956.00	6,585,347,595.87	61.35
Output 2	International Highway Network Construction Project	3,158,551,010.00	2,592,493,676.82	82.08
Output 3	Intersection Safety Improvement Project	1,471,555,917.00	716,539,751.04	48.69
Output 4	Rehabilitation of Highway Network connecting between regions	4,982,390,042.00	4,037,559,987.19	81.04
Output 5	Railway Crossing Bridge Construction Project	1,060,532,129.00	905,893,635.69	85.42

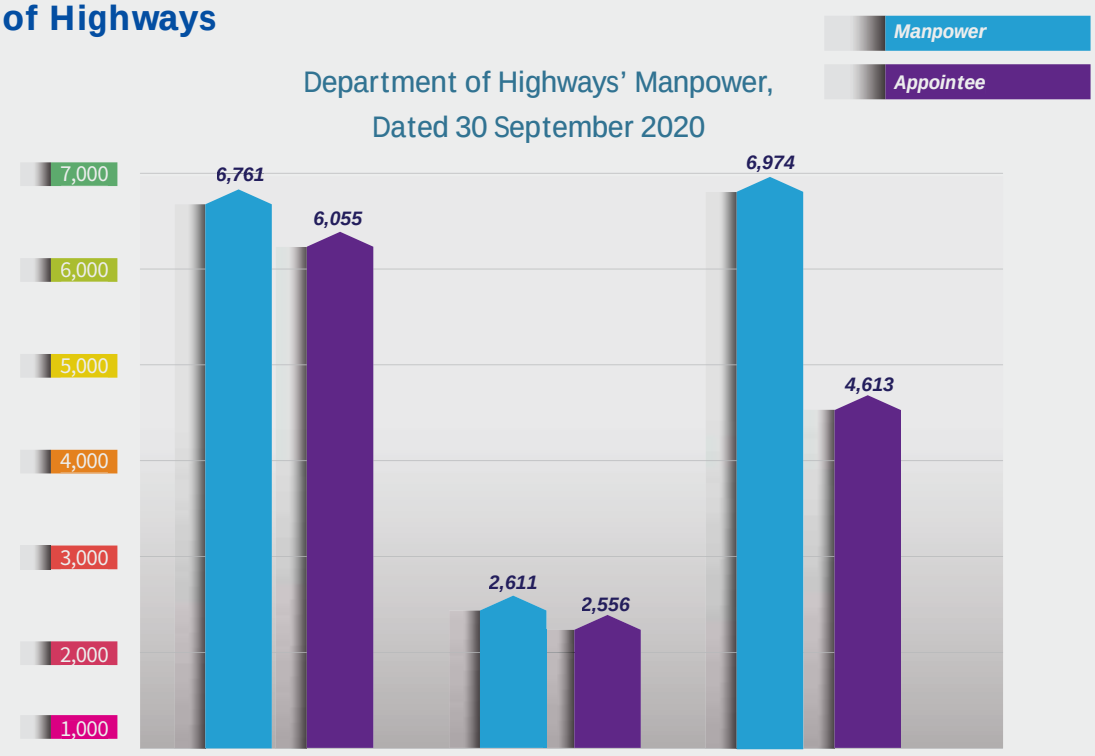
Unit : Baht

workplan/output/project		Budget after transfer or adjustment	Retained Disbursement	%
Output 6	National highway network construction project	28,000,231,295.00	24,237,662,992.21	86.56
Output 7	Highway development for Improvement of traffic and transportation	7,741,917,760.00	3,433,305,127.75	44.35
Output 8	Analysis of Public-Private Partnership suitability	40,316,300.00	8,777,342.53	21.77
Output 9	Improvements of pavement marking for safety	706,606,786.00	164,991,596.92	23.35
Output 10	Lane widening construction of Borommaratchachonnani Parallel Elevated highway	57,140,800.00	7,365,097.31	12.89
Output 11	Development project of rest area and highway weight control stations	1,153,074,798.00	927,179,266.76	80.41
Output 12	Construction project of an overpass of highway no. 35; Thonburi-Pak Tho (Rama 2 Road)	966,914,000.00	316,534,956.21	32.74
Output 13	Safety improvement project around the school	561,695,954.00	382,782,660.88	68.15
Output 14	Project to support the consumption of rubber in the duty of the Department of Highways	300,000,000.00	0.00	
6. Workplan: Integrated workplan for area development in regions		2,710,000,000.00	719,975,200.07	26.57
Output 1	The project for increasing the potential in infrastructure of target and border city	297,781,623.00	95,256,730.06	31.99
Output 2	The development project of the tourism group of Lanna culture and ethnic group	349,609,704.00	86,851,295.23	24.84
Output 3	Development and promotion project of natural and Eco-Tourism	213,971,010.00	95,682,967.70	44.72
Output 4	City and the central economic zone development project	297,107,550.00	95,956,400.58	32.30
Output 5	Management project of natural resource and solving natural problem	27,410,000.00	8,208,351.80	29.95
Output 6	Development project of trade and tourism in border city	304,526,631.00	43,017,766.22	14.13
Output 7	Development project of the Eastern Border Economic Area in Industry, Trade and Investment	78,568,532.00	27,664,192.00	35.21
Output 8	Promotion project of eco-tourism, religion, culture and civilization	211,720,652.00	37,126,541.20	17.54
Output 9	The central province development project for being a livable city	39,095,995.00	12,091,939.91	30.93
Output 10	Natural Tourism Promotion and Development Project	24,781,000.00	7,498,511.21	30.26
Output 11	Development project of large transportation network and around rail stations of potential northeast cities	509,239,560.00	162,791,277.47	31.97
Output 12	Project of increasing economic strength along the border and the northeast economic corridor	120,908,876.00	20,337,928.14	16.82
Output 13	Enhancement project of service standard and tourism business in famous tourist attraction of the regions	201,520,457.00	27,491,298.55	13.64
Output 14	The infrastructure development project for supporting industrial zones and world trade linkage	33,758,410.00	0.00	

Manpower
Department of Highways

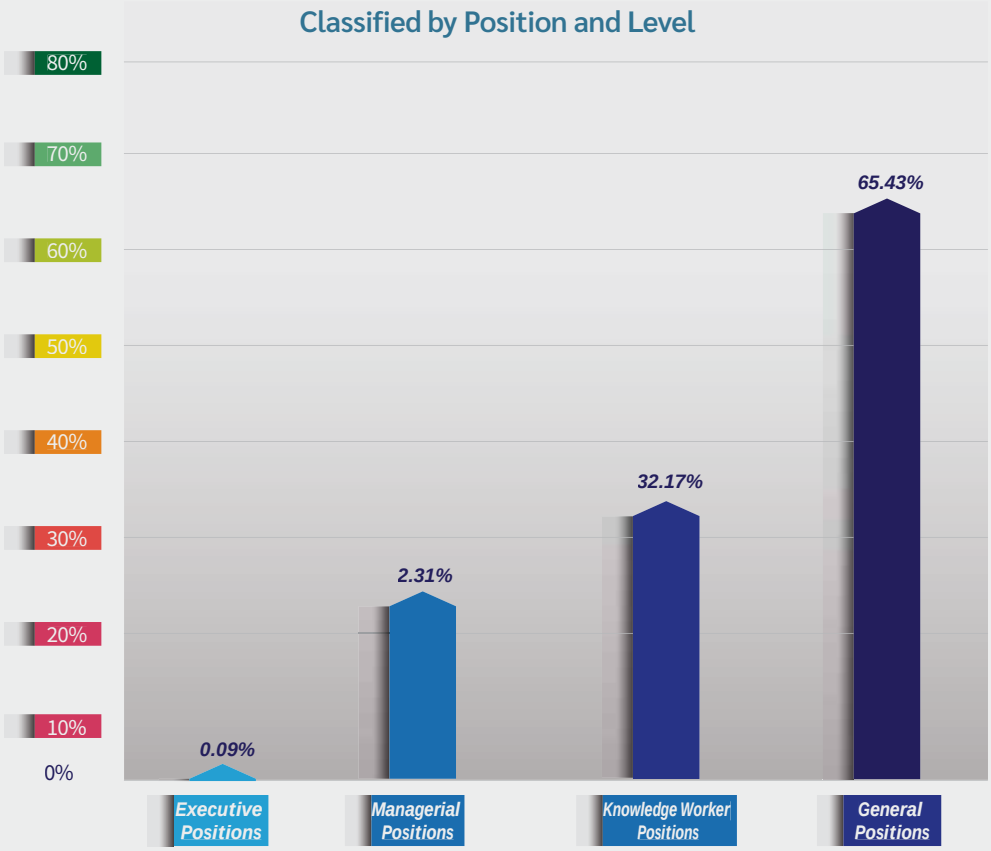


1. Fact of Highways

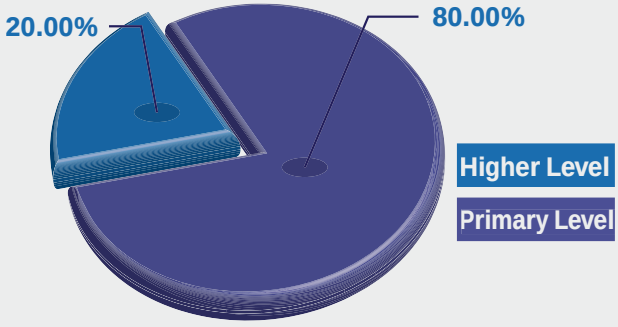


	Officials	Permanent Employee	Government Employee
Manpower	6,761	2,611	6,974
Appointee	6,055	2,556	4,613

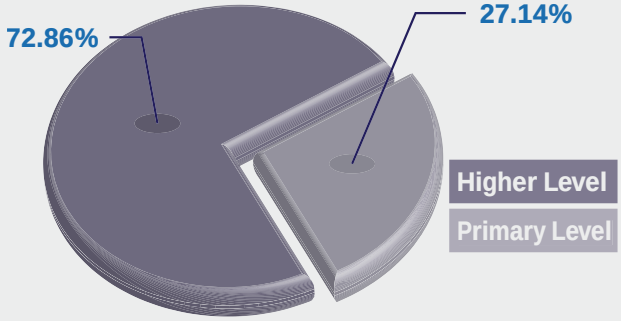
Officials' Manpower, Fiscal Year 2020
Classified by Position and Level



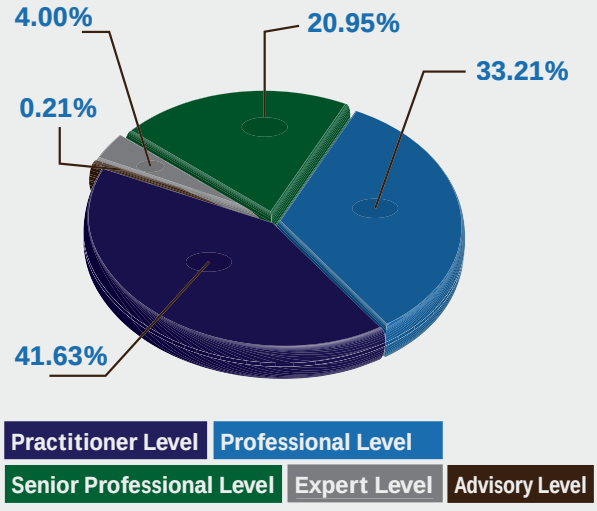
Executive Positions



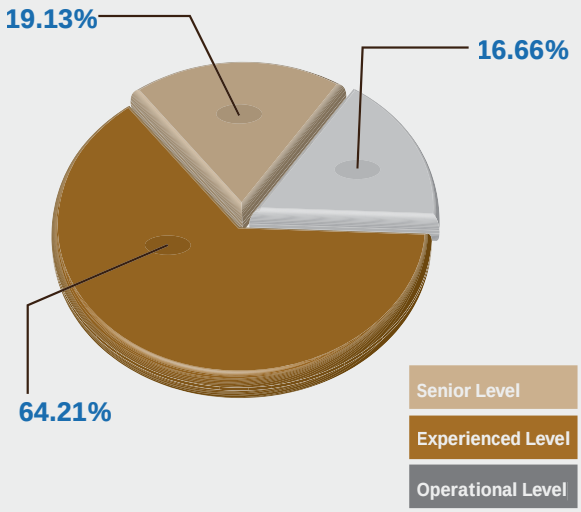
Managerial Positions



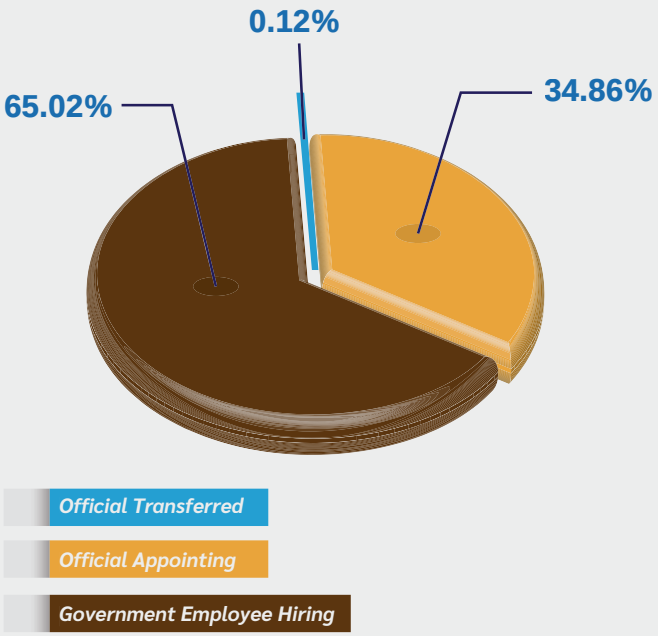
Knowledge Worker Positions



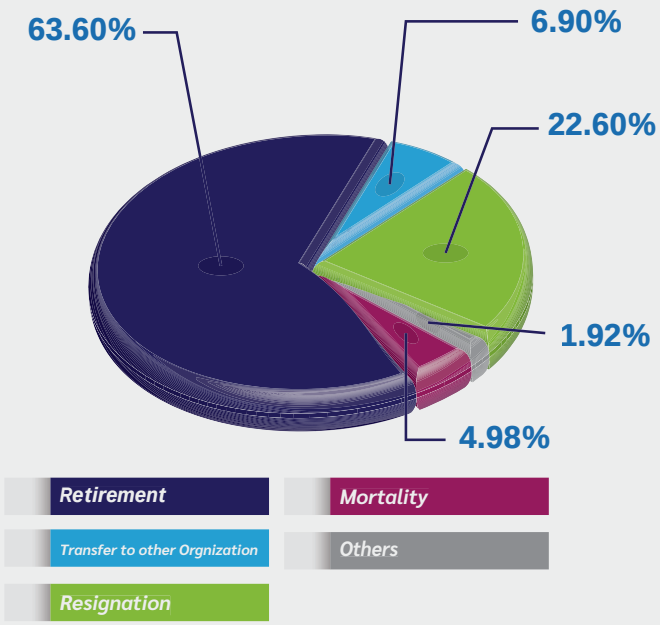
General Positions



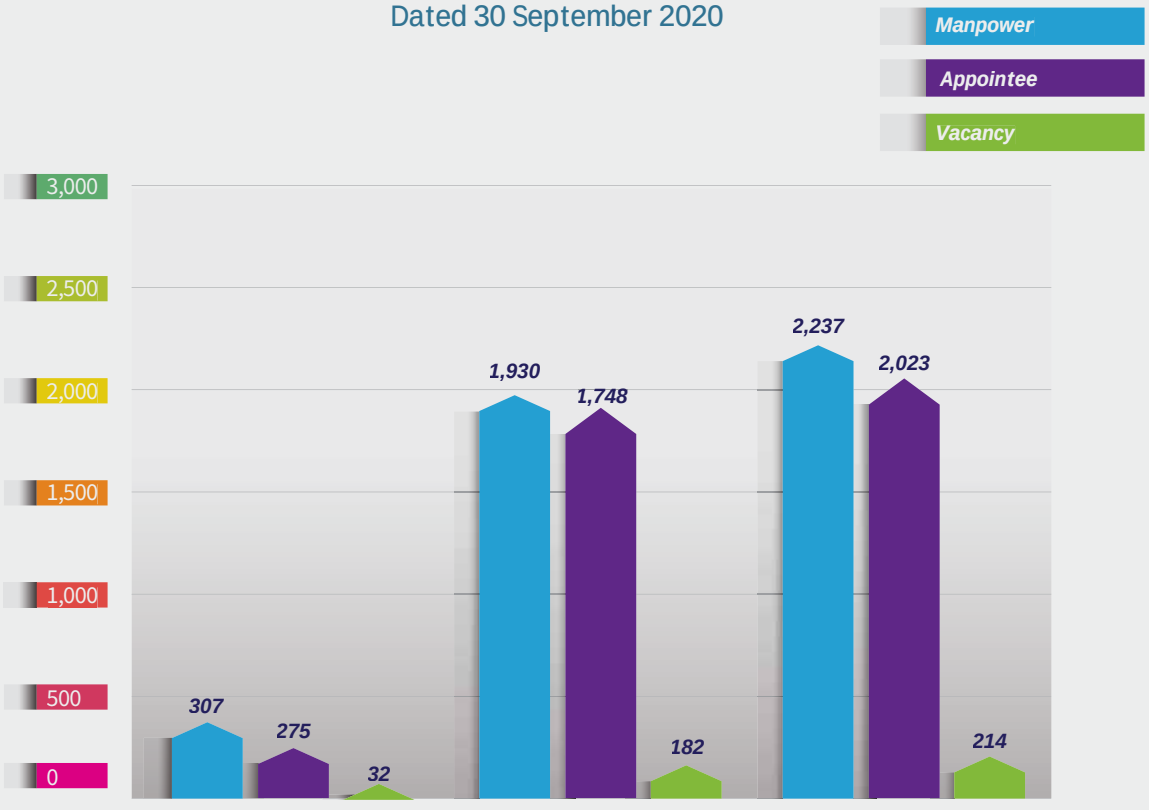
Officials and Government Employees Recruitment of the DOH, Fiscal Year 2020



DOH's officials Loosing Rate, Fiscal Year 2020



Highway Police's Manpower, Dated 30 September 2020





2. Overall Performance in 2020 (Annual Excellent Projects)

Human Resource Management of the Department of Highways

Human Resource Management has played an important role in supporting the Department of Highways missions to achieve the goal, this is a strategical human resource management which consistently follow the Department of Highways' mission. The Human Resource Management mechanism covers: reviewing and preparation of strategic plans, organizing human resource management system, improving internal division tasks and define responsibilities of each sector, workforce management, supervision of personnel information, recruiting and appointing of personnel, performance management for promoting, determining responsibilities, knowledge, abilities, skills and competencies, disciplinary inquiry, encouraging morality and ethics of personnel, enhancing quality of life, personnel welfare and benefits offering, building relationships among personnel, and cremation including other operation following human resource management policies, exclude the human resource development. In fiscal year 2020, the Department of Highways has implemented the human resource management as following steps;

1. Supervising and monitoring the overall outcome of human resource management of year 2017 – 2021 from the relevant agencies who responsible for the projects or activities every 6 months and 12 months. It is aimed to direct and create strategical human resource management, and develop personnel capacity enhancing and supporting the vision and mission of the Department of Highways to achieve goal sufficiently.

2. Reallocating manpower within organization in order to comply with the amended mission and to manage the human resource continually and flowy. For example, allocating Civil Engineer, Senior Professional Level for Construction Supervision division, Office of Highway 7, 11, 16 and 18, allocating Mechanic, Senior Level for the electric division, Office of Highway supporting the determination of Electrician, Senior Level position, allocating the Civil Engineer, Practitioner and Professional Level, and Mechanic, Operational or Experienced Level to Engineering division of Highway

District, allocating Civil Work Technician, Operational or Experienced Level to Highway Depot, Operational division of Highway District, allocating Supportive General Position, Operational or Experienced Level for Bureau of Highway Construction 1 and 2, in order to determinate the position of Civil Work Technician, Operational or Experienced Level, allocating Land Expropriation Officer, Practitioner and Professional Level for Office of Highway 4, 8, and 17 in order to support Legal Officer determination, Practitioner and Professional Level, allocating Economist, Practitioner and Professional Level of Bureau of Planning for supporting Environmentalist, Practitioner and Professional Level position, allocating Government Employee, Civil Work Officer to Bureau of Highway Construction 1 and 2 and Bureau of Bridge Construction etc. The allocation of Knowledge Worker Position, Senior Professional Level and General Position, Senior Level is currently in the process of approval of Ministry of Transport.

3. Improving position determination of civil servant according to criteria and method specified in the Office of the Civil Service Commission's letter No. Nor Ror 1008/Vor 2 dated 19 February 2016 which has been approved by the Extraordinary Subcommittee of the Department of Highways and currently in the process of the Ministry of Transport consideration in order to conform to the amended mission of the Department of Highways and to create progress in career path for the employees by the following steps;

3.1 Amending the classification title for vacancy

1) Amend 2 positions from Management Specific Field (Civil Works Operation), Primary Level to Management Specific Field (Civil Engineering), Primary Level

2) Amend 13 positions from Mechanic, senior level to Electrician, senior level, Electrical division, Office of Highway

3) Amend 57 positions of General Position, Operational or Experienced Level to Electrician, Operational or Experienced Level, Engineering division of Highway District

4) Amend 22 positions of General Position, Operational or Experienced Level to Civil Works Technician, Operational or Experienced Level, Bureau of Highway Construction 1 and 2

5) Amend 2 positions from Economist, Practitioner or Professional Level to Environmentalist, Practitioner or Professional Level, Environmental division, Bureau of Planning

6) Amend 2 positions from Economist, Practitioner or Professional Level to Civil Engineer, Practitioner or Professional Level, Planning division and Engineering Assessment division, Bureau of Planning

7) Amend 1 position of Economist, Senior Professional Level to Plan and Policy Analyst, International Highways Development group, Bureau of International Highways Cooperation

8) Amend 3 positions from Land Expropriation Officer, Practitioner or Professional Level to Legal Officer, Practitioner or Professional Level, Office of Highway 4, 8 and 17

3.2 Amendment of the classification title for occupied positons

1) Amend 93 positions from General Position to Knowledge Workers Position, General Administration Officer, Practitioner or Professional Level, which has been approved by the Extraordinary Subcommittee of the Ministry of Transport.

2) Amend 3 positions of Economist, Practitioner or Professional Level to Plan and Policy Analyst, Practitioner or Professional Level, International Highways Development group, Bureau of International Highways Cooperation.

3.3 Amend position determination to be higher level

1) Amend 30 positions from "Management Specific Field (Civil Engineering), Primary Level" to "Management Specific Field (Civil Engineering), Higher Level"

2) Amend 1 position of Chief of General Administration Division, Office of Highway 16 from "General Service Officer, Senior Level" to "General Administration Officer, Senior Professional Level"

4. Improving an internal reallocation of Tak Highway District 2 (Mea Sot) by establishing Friendship Bridge Management unit and adding more positions by allocating 3 positions such as one of Civil Works Technician, Senior Level and 2 positions of Civil Works Technician, Operational or Experienced Level from the Construction Supervision division, Office of Highway 4.

5. Reviewing and concluding the job description that requested for amending in accordance with Vor 2/2558 as following details;

5.1 Managerial Position such as 30 positions of Management in Specific Field (Civil Engineer), Higher Level and 2 positions of Management in Specific Field (Civil Engineer), Primary Level

5.2 Knowledge Workers Position such as 4 positions of Civil Engineer, Senior Professional Level, 1 position of General Administration Officer, Senior Professional Level, 1 position of Economist, Senior Professional Level, 2 positions of Civil Engineer, Practitioner Level, 93 positions of General Administration Officer, Practitioner or Professional Level, 3 positions of Legal Officer, Practitioner or Professional Level, 3 positions of Economist, Practitioner or Professional Level, and 2 positions of Environmentalist, Practitioner or Professional Level.

5.3 General Position for example, 1 position of Civil Works Technician, Higher Level, 13 positions of Electrician, Higher Level, 49 positions of Civil Works Technician, Operational or Experienced Level and 57 positions of Electrician, Operational or Experienced Level.

6. Reviewing and determining criteria, regulation or guidelines relating to human resource management as follow;

6.1 Criteria and regulation for appointing the General Management Position from General Positon, Experienced Level to be Knowledge Workers Position, Professional Level of the department located in four southern border provinces area such as Pattani Highway District, Yala Highway District, Narathiwat Highway District and Satun Highway District. It is implemented to conform to the guidelines set forth in the Office of the Civil Service Commission's letter No. Nor Ror 1006/Vor 16 dated 28 July 2015 especially when the Department of Highways is unable to recruit and appoint the civil servant by using any methods provided by the Office of the Civil Service Commission and the Department of Highways.

6.2 Guidelines to promote the civil servant who is General Position to be Knowledge Workers Officer including Civil Engineer, Practitioner Level and General Administration Officer, Practitioner Level from the candidate list of the Department of Highways. The guidelines and process to promote the civil servant who is General Position, Operational or Experienced Level and meet the criteria of the Office of the Civil Service Commission has been established for advanced career path of government officials in General Positions and to strengthen morale in performance as well as to drive the human resource management of the Department of Highways more flexible and efficient.

6.3 Criteria and selection process for several positions such as Management in Specific Field (Civil Engineer/Civil Work Operation), Primary Level (Director of Highway District), Civil Work Technician, Higher Level (Deputy Director of Highway District), Civil Works Technician, Higher Level (Chief of Friendship Bridge Management Section, Highway District), General Position, Higher Level, General Service Officer, Higher Level and General Administration Officer, Professional Level (Chief of General Administration Division, Highway District) for systematic and transparent performance to be consistent with the Civil Service Act B.E 2551 and position determination standard of the Office of the Civil Service Commission

6.4 Process/Guidelines of personnel dispatch to new assigned department by dispatching personnel who received any order such as promoting, transferring/moving, acting or action for etc. to report to and start new assigned job on the date stipulated in the order strictly in order to eliminate problem of human resource management might occur from misunderstanding of personnel dispatching to new assigned department.

7. Transferring government official as a policy of the Director General

with a survey of government officials' intention. This is an opportunity for all government officials to notify their wishes and requests for a move because of necessity and appropriation as well as to give an opportunity for them to move to their hometown, accumulate a variety knowledge and experience, provide them operational potential for being the basis of career path for higher progress.

8. Improving official ID card procedure by computer

which started in January 2016. There are 5 categories of official ID card such as civil servant, government employee, permanent employee, retired government official and permanent employee receiving retirement pension. The official ID card procedure by computer is implemented under the Government Official ID Card Act B.E. 2542 and the Ministerial Regulation (B.E. 2542) issued by virtue of the Government Official ID Card Act B.E. 2542 for expanding a period of using, safety increasing and counterfeit protection.

9. Transferring of government employee and permanent employee information to the Departmental Personnel Information System: DPIS and improving the program as follow;

9.1 develop individual Key Performance Indicators: KPIs and program of individual KPIs report

9.2 develop salary management program

9.3 develop data record program of recruitment and contract expansion of government employee

9.4 develop program of vocation setting of civil servant, permanent employee and government employee who work for security affected area (Red Area)

9.5 Modify the program of position promoting for permanent employee

Information, system using manual and problem solving distributed through line application on "DPIS Department of Highways" group and TeamViewer program using.



10. Integrity and Transparency Assessment – ITA in fiscal year 2020

with 3 mechanisms such as Internal Integrity and Transparency Assessment: IIT for the Department of Highways' employee, External Integrity and Transparency Assessment : EIT for people who contact to the Department of Highways and Open Data Integrity and Transparency Assessment : OIT through ITAS. It is operated covered entirely the guidelines of the Office of the National Anti-Corruption Commission and completed on time.

11. Selecting of the outstanding performance of civil servant of the Department of Highways year 2019

which is followed the criteria and procedure specified by the Ministry of Education. There are 5 persons selected to receive the outstanding award, 10 persons selected to receive the honorary mention award, and 16 persons selected to receive the certificate of honor. The awarding ceremony was hold on 17 August 2020 at Terdsak Sedthamanop Seminar Room, the Department of Highways. In addition, the Department of Highways selected 3 civil servants to submit the Ministry of Education for outstanding civil servant awarding year 2019 which were Mrs. Siriporn Tiendam, Director of the Bureau of Legal Affairs, Mr. Apichai Issariyanukula, Civil Engineer, Senior Professional Level, Bureau of Planning and Mr. Pathanapon Krodtem, Civil Works Technician, Cha-uat Highway Depot, Nakhon Si Thammarat 2 (Thung Song). The Ministry of Transport arranged the ceremony of the outstanding civil servant award on 17 August 2020 at Clubhouse Building and Meeting Hall, the Ministry of Transport. Such event has been published on News, website of the Department of Highways.

12. Organizing the activity of royalty and monarchy honoring

12.1 Organize the oath of office ceremony to be a good official and country supportive on 24 July 2020 at 09.30, Terdsak Sedthamanop Seminar Room, 3rd floor, Training Division, the Department of Highways, on occasion of H.M. King's Birthday on 28 July 2020 including the oath of allegiance to the monarchy, singing of Hail H.M. King and Thai Royal Anthem songs, in order to present honor to royalty and to be remembrance of His Majesty King, and intension to be a good official and country supportive.

12.2 Organize activity of "Practice the dharma for royal charity" on 24 July 2020 at 10.45 – 12.00, Recreation building, Department of Highways on the occasion of His Majesty King Maha Vajiralongkorn Phra Vajiraklaochaoyuhua's Birthday including making merit, offering alms, and meditation for offering royal charity in order to present honor to royalty and to be remembrance of His Majesty the King.

12.3 Organisze activity on the occasion of Her Majesty Queen Sirikit, The Queen Mother's Birthday on 12 August 2020 with making merit, offering alms, and meditation on 5 August 2020 at 10.45 – 12.00, Recreation building, Department of Highways for offering royal charity.

13. Enhancing the moral and ethical awareness of personnel as well as promote prevention and suppression of corruption and misconduct in the public sector

13.1 Driven Implementation of the action plan to promote moral, ethics and prevention of corruption and misconduct in the public sector of the Ministry of Transport and the Department of Highways year 2020 by providing programs or activities aimed to enhance moral and ethics awareness to personnel of the Department of Highways and insist on behave, 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. The result of activities has been reported to external organization such as Ministry of Transport and Office of the Civil Service Commission twice a year.

13.2 Selection and submit the personnel who is truthfulness, virtuous and transparently performance as a role model to the Ministry of Transport to be "Transport Role Model in 2020". Mr. Apichai Issariyanukula, Civil Engineer, Senior Professional Level, Inter-City Motorway Division is selected as a "Transport Role Model in 2020" and participate in the ceremony on 10 September 2020 at 08.00 – 12.00, Clubhouse Building and Meeting Hall, 3rd floor, the Ministry of Transport.

13.3 Submission the personnel to participate "Spirit and Virtue Transport Organization" workshop on 23 July 2020 at 08.30 – 16.30, Patcharavadi Room, Prince Palace Hotel, Mahanak, Bangkok and "Virtue Day" on 10 September 2020 at 13.00 – 16.30, Clubhouse Building and Meeting Hall, 3rd floor, the Ministry of Transport.

13.4 Continuing for organizing activities to enhance ethics, prevent and suppress corruption and misconduct, for example, delivering sermons as well as a meditation retreat provided every Wednesday and holy days.



13.5 Promote activities to enhance morality and ethics, praising personnel who behave as a good example as well as prevent and suppress corruption and misconduct in public sector such as the award of outstanding performance of the Department of Highways' personnel in 2019, strategy and guidelines to prevent and suppress corruption, etc.

Administrative System
Development



Performance of the Department of Highways based on improving government operations efficiency in the fiscal year 2020

No	Indicator	Weight (%)	Target			Working Performance	Score
			Minimum (50)	Standard (75)	High - Level (100)		
1	Number of Road accident death per hundred thousand population (Joint KPIs OPS, MOT.,DOH.,DRR.,MPH)	20	not over 31.99 (per hundred thousand population)	not over 27 (per hundred thousand population)	not over 21 (per hundred thousand population)	20.56	100.00
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)	20	87 %	89 %	91 %	15.01 %	-
3	Use of rubber as an ingredient in Highway	30	12,000 trees	12,500 trees	13,000 trees	20,734 trees	100.00
4	Route exchange operation between Department of Highways (DOH) and Department of Rural Roads (DRR)	30	32.47 km.	36.08 km.	39.69 km.	52.639 km.	100.00

Remarks: As the second indicator, Department of Highways would inform that situation as affected by the Corona virus Disease pandemic (Covid-19) and the Budget Expenditure Transfer Act, B.E. 2563 (Road Maintenance), DOH has allocated the budget's disbursement to mitigate Covid-19 pandemic for 131 schemes, as amount of 2,119,930,000 baht. As a result, the highway maintenance budget has been reduced from the plan set. Besides, the budget in the fiscal year 2020 was announced in the second quarter, causing the signing of the agreement delayed than the previous fiscal year. Moreover, to prevent the spread of the Corona virus Disease pandemic (Covid-19) , restricting entry into or travelling across regions to do field survey, workers must be quarantined for 14 days as safety obligation. As a result, conducting a survey of DOH is unable to achieve the goal. Therefore, the percentage of IRI distance is less than 3.5 meters per kilometer which is lower than the goal set.



As the Corona virus Disease pandemic (Covid-19) nowadays, The Office of the Public Sector Development Commission (OPDC), therefore, will not use the result of performance of the government sector factor to evaluate. Yet, the government sectors are able to use the results of performance from the former indicators as monitoring only.

Human Resources Development of Department of Highways



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 2020 were set from vision analysis, mission, value, strategy, personnel information, training needs for human resource development which survey from the project monitoring and evaluation of the Training Division in 2020 by collaborating with the department head and representation of training participant.

To prevent the spread of Coronavirus Disease 2019 pandemic (COVID-19), the government has implemented measures for every government agency, so the Training Division changed the training course and the seminar patterns to comply with the policy. The human resources development implementation of the Department of Highways in the fiscal year 2020 are as follows;



1. Personnel Promotion and Development The department of highways has promoted the learning capability of personnel in various forms. The training programs were provided, which following the organization policy and urgent necessity as follows;

1.1 Human Resources Development by Policies and Strategies consist of a seminar of the Department of Highways executives in the fiscal year 2020 on "To Drive the Government Policy and Lead the Organization to the Goal in the Era of Disruptive Technology", The Training Course for the new chief of Highway District, The Training Course for Project Engineer, The Orientation course for the New Civil Servants of the Department of Highways Batch 24. Four core training courses above-mentioned are arranged every year to increase the officers' efficiency.

Moreover, digital transformation enables individuals to access to and publish informationn as one own convenient, so the government is aware of the shift and encourage the government offices to develop their technology capability. The department of Highways provided eight infographic creation courses to repose to the government policy "Thailand 4.0". The courses were designed for IT Staffs of each division about E-office and Electronic Document System.

1.2 Highway Engineering Promotion and Development aims to systematically develop engineers, corresponding to the Department of Highways' missions. For example, the Highway Engineering of the Department of Highways training course Batch 9, on the job training course for New Civil Engineer and Civil Works Technician positions, the seminar reinforces the capability in the highway depot management Batch 5-7, a continuous development of the highway depot chief from the last fiscal year. The seminar aims to share knowledge, experience, technique, and solution about the highways depot's work.

1.3 Administrative Promotion and Development The Department of Highways is a large government organization that has various kinds of careers including the main careers in engineering and the supporting positions. The personnel of the DOH has to improve the their competency in order to support visions and responsibilities of the DOH. Thus, the DOH necesslily provided training course for developing personnel's competency. There are the Training Course on Negotiating Improving and Conflict Management, The Training Course for the Beginner-level and Mid-level Executive of the Department of Highways.





1.4 Knowledge Management Promotion.

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 knowledge promotion project for innovation in the organization at Nakhon Ratchasima Highway District 3 and Surat Thani Highway District 3. Every project focuses on learning culture that enable personnel to exchange knowledge together.

1.5 Moral, Ethics, and Quality of Life.

Nowadays, the righteousness and morality are highly regarded. The ethics value was included in law and became Civil Service Code of Ethics. Government agencies have to enhance efficiencies and motivating civil servants to work effectively and morally. Department of Highways expects staff to understand the principles of Buddhism, so the training course pertain to righteousness and morality are arranged every year. In the fiscal year 2020, the Training Division has two training courses regarding Enhancing Moral, Ethics, and Quality of Life. The first topic was "the meditation with Jaidee Jaisabai" at Wat Pah Subthawee, Wang Nam Khiao District, Nakhon Ratchasima, and the other topic was "Work-life Balance" at Cherntawan International Meditation Center, Chiang Rai. All courses aim to instill morality and ethics into the government's staff that are the core competencies

1.6 Human Resource Development Cooperation Promotion For good service and increase the efficiencies of the Department of Highways' work, the department conducted a need analysis and cooperate with Royal Thai government. The cooperation was to request for advocacy in order to financially support officers to pursue their education. The Department of Highways sent the officers to train with the other departments in various courses such as The Mid-Level Executive of the Transport Management Program by the Ministry of Transport, The Executive Development Program by the Office of the Civil Service Commission.

Moreover, the Department of Highways has participated in Continuing Professional Development (CPD) that is certified by the Council of Engineers, Thailand. The participants who passed the training courses of the Training Division, Department of Highways will get the Professional Development Unit (PDU). The PDU can be used as an extra score for an interview to promote the level of ordinary engineers. The training courses with the PDU of the Training Division, Department of Highways in the fiscal year 2020 are as follows;

Activities/Projects/Training courses of The Department of Highways in the fiscal year 2020 Professional Development Unit (PDU)

ที่	Projects/Training courses	Professional Development Unit (PDU)
	Technical Courses	
1	Highway Engineering of the Department of Highways Training Course Batch 9	134
2	The Training Course for Project Engineer Batch 2	82
3	The Seminar Reinforces the Capability in the Highway Depot Management Batch 5	20
4	The Seminar Reinforces the Capability in the Highway Depot Management Batch 6	21.5
5	The Seminar Reinforces the Capability in the Highway Depot Management Batch 7	19
6	The Training Course on Road Safety Audit During Construction and Pre-Opening	48
7	The Seminar of Bureau of Material, Analysis and Inspection Staffs in the fiscal year 2020	17.25
8	On the Job Training Course for New Civil Engineer and Civil Works Technician positions	
	Part 1 Basic Highway Engineering of the Department of Highways Batch 22	117
	Part 3 Presentation of Learning outcome Batch 21	60
	Part 3 Presentation of Learning outcomes Batch 22	27
9	Third Country Training Program on International Road Infrastructure Development for ASEAN and BIMSTEC Networks: TCTP	218
10	The training course on infographic creation for applying in work Batch 1-8	12

ที่	Projects/Training courses	Professional Development Unit (PDU)
	Others	
11	The Department of Highways' executives on "To Drive the Government Policy and Lead the Organization to the Goal in the Era of Disruptive Technology", fiscal year 2020	11
12	The Mid-Level Executive of the Department of Highways Course Batch 19, fiscal year 2020	133
13	The JCB Backhoe Loader training Batch 1-3	21
14	E-Learning training courses in the fiscal year 2020	
	Highways Construction Management Course	4.5
	Highways Safety (Traffic signs) Course	1.5
	Highways Safety (Road markings) Course	3
	Highways Maintenance Course	3
	Road Safety Audit for Maintenance Work Course	1.5
	Work Zone Traffic Management	3

For the international cooperation, the Department of Highways still develops academic cooperation with the ASEAN countries for the International highway infrastructure developing benefit. In the fiscal year 2020, Training Division arranged many courses, including the training course for Delegates from the government of the People's Republic of Bangladesh topics strategic planning and highways network development of Thailand, Road safety management and infrastructure development with economic growth, and the Third Country Training Program on International Road Infrastructure Development for ASEAN and BIMSTEC Networks (TCTP) under a memorandum of understanding between Japan International Cooperation Agency (JICA), Thailand International Cooperation Agency (TICA) and Department of Highways.

2. Allocation of Scholarships

The Department of Highways supports the officers who desire to enhance the knowledge. The scholarships were allocated to officers according to the professional necessity of the organization. In the fiscal year 2020, the amount of 5,411,500 baht of scholarships was allocated for the recipients.

3. Core Training Course of the Department of Highways content review

The Department of Highways emphasized the Core Training Course development that arranges every year. There are seven courses as follows;

1. On the Job Training Course for New Civil Engineer and Civil Works Technician positions

2. The Highway Engineering Course

3. The Beginner-level Highway Executive Course

4. The Mid-level Highway Executive Course

5. The Training Course for Project Engineer

6. The Training Course for the new chief of Highway District

7. The Orientation Course for the New Civil Servants

The Training Division monitors and evaluates all of the Core Training Course in 2020 by interviewing the participants of the Core Training Course to develop the contents, activities, learning styles, and lecturers.

4. Operating Results in Human resource development in the fiscal year 2020

There were 54 projects in human resource development with 5,234 participants and the total budget of 18,774,886.68 was spent.



The human resource development project followed the human resource development plan

There were 18 projects/courses and 2,586 participants.
The budget of 8,843,876.68 was spent.



The unplanned human resource development project

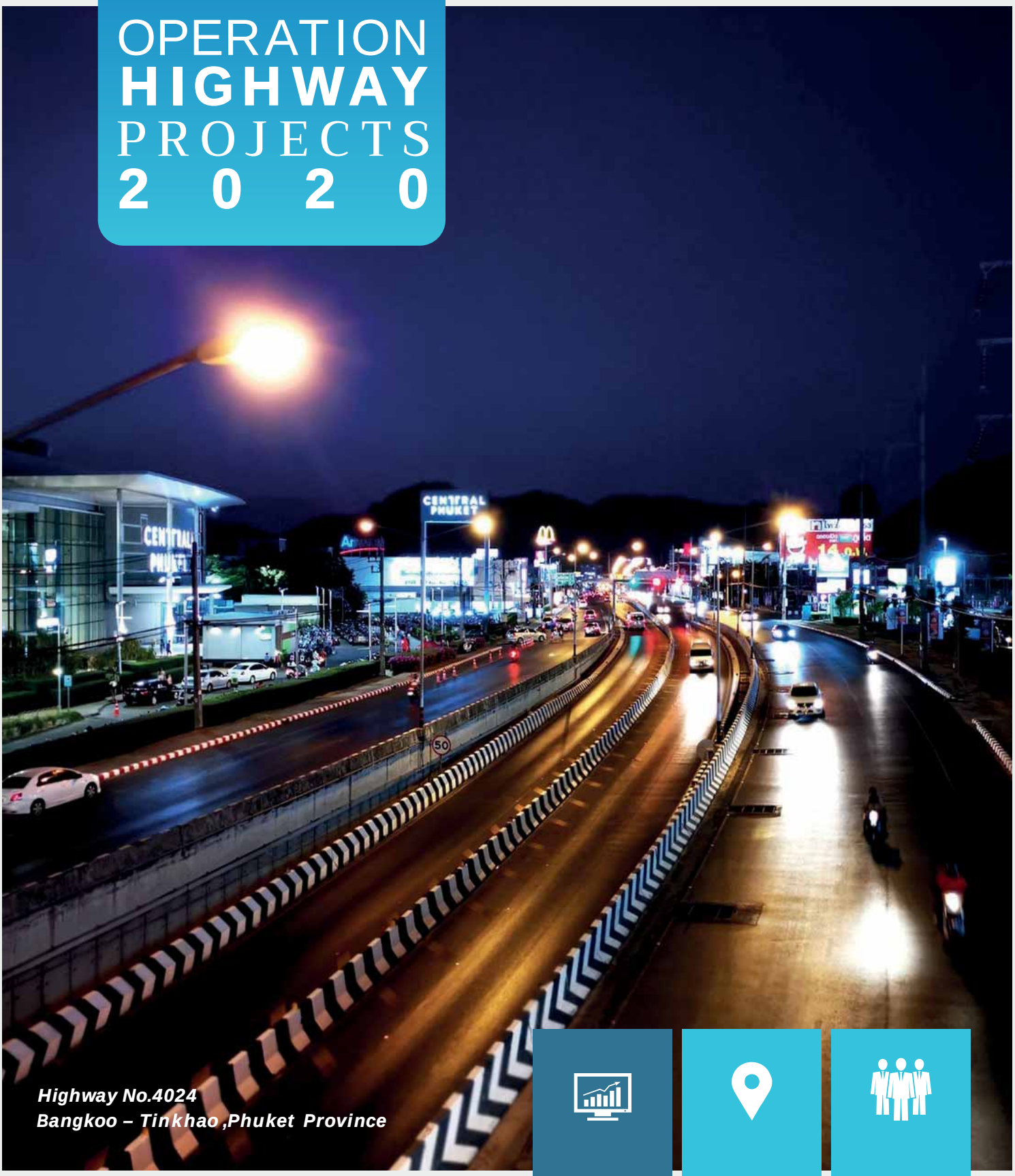
There were 3 projects/courses and 385 participants
and the budget of 987,760 was spent.



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

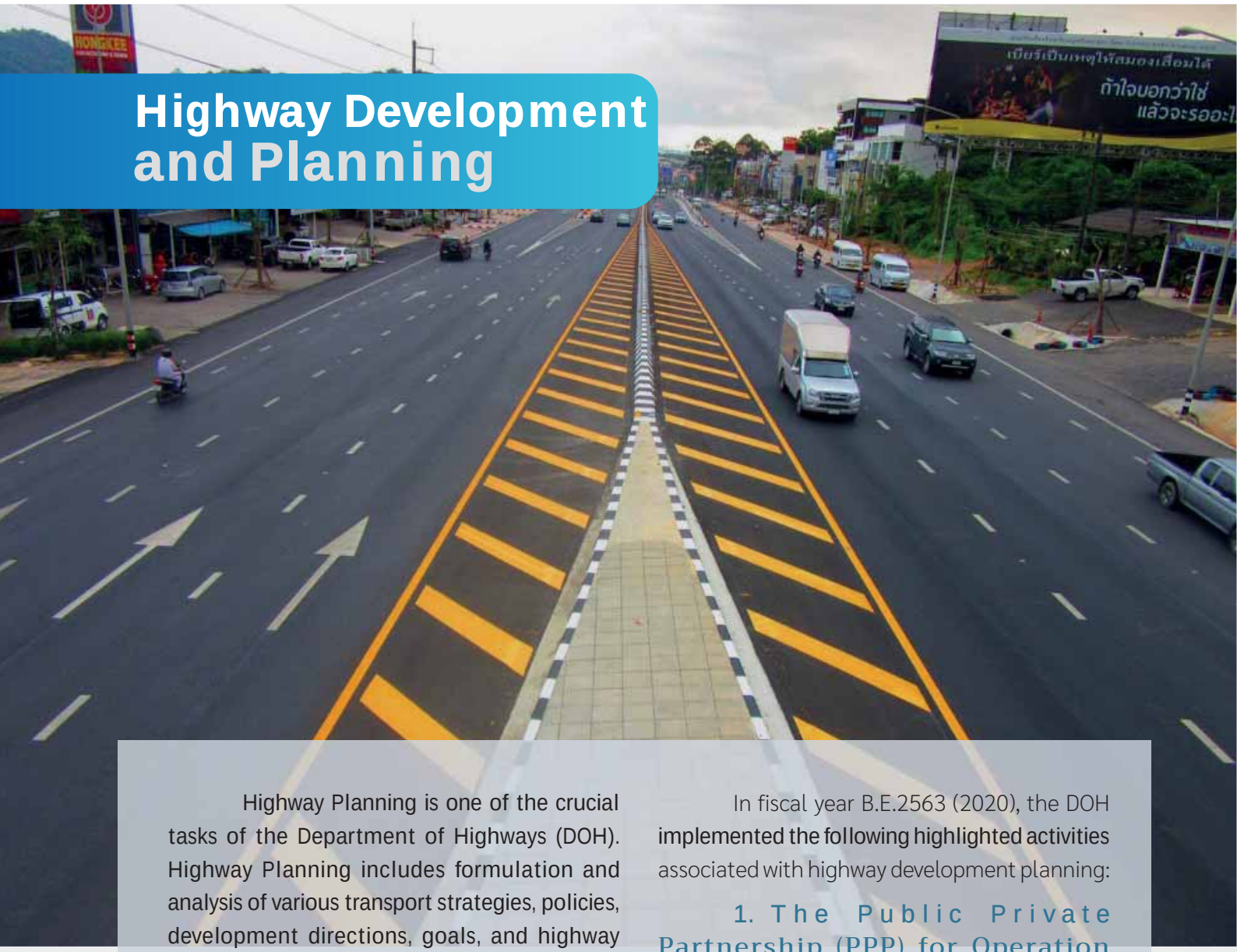
There were 31 projects/courses and 2,394 participants
and the budget of 8,943,250 was spent.

OPERATION HIGHWAY PROJECTS 2020



Highway No.4024
Bangkoo – Tinkhao ,Phuket Province

Highway Development and Planning



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.2563 (2020), 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 14 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 8 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 22 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 PPP contract is in the process of drafting and proofreading by the Office of the Attorney General and expected to be complete and signed with the successful bidder by the end of 2020 in order to keep up with the operation schedule.

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 Phaeo Intersection. The project will have an approximate total length of 25 kilometers. In terms of progress, the PPP feasibility study of the motorway has been completed.

3. Road Hierarchical Classification for Highway Planning and Management Project

Road Hierarchy is one of the important tools used to indicate highway functions and purposed roles. Well-defined road classification systems are general seen in most developed countries, which helps enhance their efficiency of road network planning as well as safety of road design and management. In terms of DOH road network, since the beginning route numbers have been used as the hierarchical indicator to define the important of the road. The number and digits are assigned to reflect type of the connectivity. In the past, major roads were constructed to link all regional centres to Bangkok. However, the recent national strategic plan's focus has been shifted to expanding economic, social and technological hubs to other part of the country resulting in rapid regional economy and transportation infrastructure development. With such a change, the existing road classification system is not sufficient enough to reflect the proper roles and functions of the road network.

The DOH places importance on such an issue, thus initiates and carries out the Road Hierarchical Classification for Highway Planning and Management Project. The project aims to develop a comprehensive guideline and criteria for the DOH road network hierarchical classification as well as reclassify the network. The study also takes into account the national strategy, and policy together with highway development plans to ensure substantial benefit of the project result with regard to the DOH missions.

4. 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 5,246.21 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

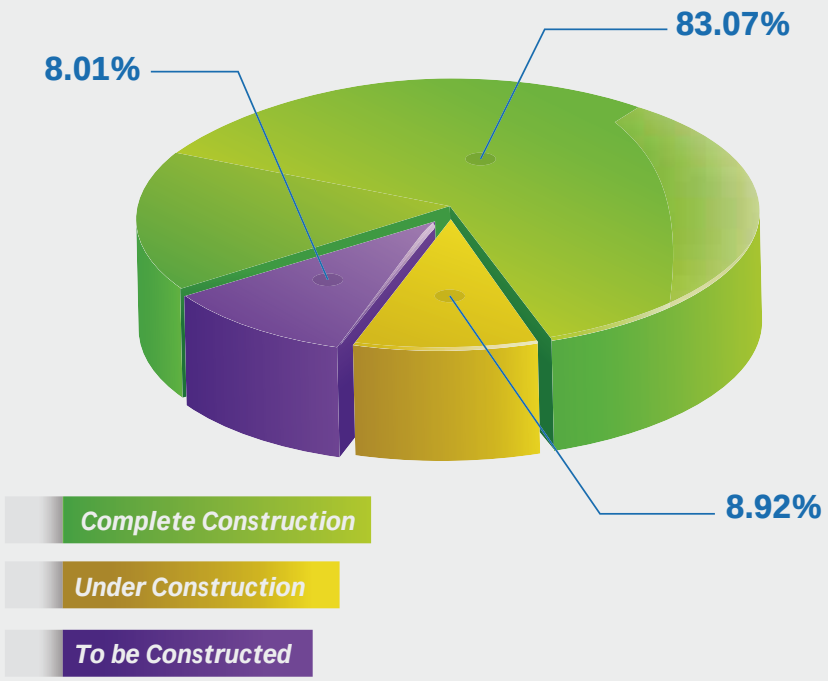


The current status of the projects is as follows:

Unit: Distance (Kilometer)

Network	Complete Construction	Under Construction	To be Constructed	Total
1	513.12	30.50	20.00	563.61
2	716.05	36.31	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	116.41	204.01	643.67
7	899.31	18.05	-	917.36
8	343.16	-	-	343.16
9	386.74	-	-	386.74
10	216.48	101.43	-	317.91
11	321.82	101.58	-	423.40
Total	4,357.99	467.76	420.46	5,246.21
percentage	83.07	8.92	8.01	100.00

Status: September, 2020



5. 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, 23 projects have been completely constructed, 17 projects are under construction, and 9 projects are in the upcoming plan.

6. 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 67 highway infrastructure projects to support the development during 2014 to 2020. As of now, 20 projects have been completed, 27 projects are under construction, and 20 projects are in the upcoming plan



Motorway No.81
Bangyai - Kanchanaburi

7. 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 2020 the DOH submitted the following project list under Thailand's Transportation Infrastructure Strategic Plan to the BB:

7.1 Major Highway Construction Projects

These large construction projects have followed the highway development master plan, with respect to national development strategies. In fiscal year 2020 the DOH has been allocated budgets for 84 new construction projects, which consist of:

No.	Project / Plan	Amount (Projects)	Construction Cost (M. THB)	Budget received in 2020 (M. THB)
1	National highway development in the special economic zones and borders	4	6,980	1,396
2	National highway development for the Eastern Economic Corridor	7	10,210	2,042
3	Primary highway rehabilitation for regional connectivity improvement	7	6,325	1,265
4	Railroad crossing bridges	6	3,100	620
5	The national highway development	54	42,335	8,467
5.1	National highway construction	30	22,950	4,590
5.2	Interchanges, bridges and tunnels construction	10	4,810	962
5.3	Bangkok and suburban traffic congestion improvement	8	6,525	1,305
5.4	Construction of four-lane national highway extension projects (Phase 2)	4	5,450	1,090
5.5	Highway development for multimodal transportation	2	2,600	520
6	International highways construction	6	5,650	1,130
	Total	84	74,600	14,920

7.2 Minor Highway Improvement Projects

In addition to the major highway construction projects noted above, minor improvement and construction projects are proposed to solve specific highway problems. The project normally is completed in a short period (less than one year) and requires less budget. The project goals 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

The objective of Highway Improvement for Community Area is to improve highway standard and capacity in urban areas or rural towns. The project also helps Improve road safety, quality of life, economic boost; on the other hand, it also helps mitigate environmental impact toward communities.

2) Construction and Improvement of Bridge and Drainage Structures

The purpose of Construction and Improvement of Bridge and Drainage Structures projects is to improve and strengthen bridge and drainage structures such as bridges, reinforced concrete square pipes, round pipes, gutters, and other structures. The project helps enhance drainage capacity in a right of way and prevent recurrent flooding. The project also includes a restoration of drainage structures, and erosion control for bridge foundation and embankment.

3) Minor Highway Improvement or Highway Efficiency Improvement

Every year, DOH highway network always faces some urgent issues on small highway sections. Due to the budget limitation and long procedure of budget approval, it requires the DOH to execute the Minor Highway Improvement project or Highway Efficiency Improvement project to efficiently solve aforementioned issues. The project usually be implemented to a small section on a major highway to alleviate traffic congestion at a bottle neck as well as improve highway capacity and standard. The project also aims to serve the increase travel and transportation demand due to the growth of economy and land development.

4) Regional Development Integration Plan

The Regional Development Integration Plans are in line with national and regional development strategies. Specifically, the projects under the Regional Development Integration Plan are also accounted for both public and private development plans such as the national tourism strategy, the Special Economic Zones development plan, the transportation network development strategy for the new economic areas, the border area development plan, all of which helps support the national development policy and the national strategy.

The budgeting details of the above activities/projects for 2020 are as follows:

No.	Activity/Project	Total Amount	
		Projects	Budget Received (M. THB)
1	Highway Improvement for Community Area	67	1,564.40
2	Construction and Improvement of Bridge and Drainage Structures	80	962.00
3	Minor Highway Improvement or Highway Efficiency Improvement	188	5,710.50
4	Regional Development Integration Plan	70	3,134.00
Total		405	11,370.90

Highway Construction



The construction project of Highway No. 11
section Doi Ti Junction - Chiang Mai

Under the responsibility of Bureau of Highway Construction 1, the construction project of Highway No. 11 section Doi Ti Junction - Chiang Mai, has been completed. The route development is a part of the Transportation and Logistics Systems Development Integration Plan. The project alignment started from km. 527 to km. 551 passing through 5 sub-districts of the main district in Lamphun which are Pa Sak, Ban Klang, Makhuea Chae, Mueang Nga, and Umong, then connecting with 4 sub-district in Chiang Mai, which are Saraphi, Yang Noeng, and Chai Sathan in Saraphi District and Tha Sala in the main district, with a total distance of 24.35 kilometers.



Highway No. 11 has played an important role in regional transportation as the main route for agricultural and industrial product transportation. The route links industrial estates in Lumphun to Chiang Mai, the major city in the region, where multiple famous tourist attractions located. Even though the highway has been maintained in a good condition, due to high transportation demand and increasing heavy truck traffic, the current maintenance program is found to be insufficient and cost ineffective. Therefore, the DOH proposed the highway enhancement by upgrading the existing 4 lane highway to 6 lane highway (3 lanes for each direction) with the highest highway standard. The road is concrete pavement with 5.5 meter raised median. The highway overpasses have been built at 4 major junctions namely Mueang Nga Junction, Mueang Kwak Junction, Pa Dat Juction, and Saraphi Junction. A total construction cost, including electrical and lighting system installation, is 1,474,671,000 baht.



The project will greatly improve network mobility, one of the mission goals, as well as promote international connectivity and economic boost especially for ASEAN community. Moreover, the enhancement also helps mitigate traffic congestion in the city of Chiang Mai.







The construction project of Highway No. 12 section Tak – Mae Sot District

Bureau of Highway Construction 1 is also in charge of the construction project of Highway No. 12 section Tak – Mae Sot District. The location is in Mae Sot District. The section was designed to upgrade the roadway from 2 to 4 lanes. As of now, a total of 86 kilometers, km. 0 to km. 86, has been completely constructed. The project aims to improve connectivity to promote the development of Special Economic Zone in Mae Sot district. The section is also a part of Highway No. 12 known as the East-West – Economic Corridor. The network starts at Da Nang in Vietnam passing through Savannakhet in Lao PDR entering Thailand at eastern border in Mukdahan. The route connects multiple provinces in Thailand such as Mukdahan, Kalasin, Khon Kaen, Phetchabun, Phitsanulok, Sukhothai, and Tak, then enters Myanmar at Mae Sot border. The network eventually ends at port city of Mawlamyine in Myanmar.

The highway was designed to a 4-lane highway with the high standard. The travel direction is divided by concrete barrier. An extra climbing lane is also implemented in high slope segments along the route. The roadway is asphaltic pavement with the lane width and shoulder width of 3.5 and 2.5 meters, respectively. A total construction cost, including electrical and lighting system installation, is 1,356,098,755 baht.

The project helps improve the section mobility, accessibility as well as safety, which eventually enhances the efficiency of the road network. The better network will ultimately support economic growth along the East-West – Economic Corridor as well as improve people quality of life.





The construction project of Highway No. 33 section Ban Phachi – Ban Hinkong

The construction project of Highway No. 33 section Ban Phachi – Ban Hinkong was carried out by the Bureau of Highway Construction 1. The highway was set to be upgraded from 2 to 4 lanes according to the 2nd Phase of Four-Lane National Highway Extension Plan under the Transportation and Logistics Systems Development Integration Plan. The project starts from km. 69+250 in Phachi district of Ayutthaya province and ends at km. 81+000 in Nong Khae district of Saraburi province with a total distance of 11.75 kilometers. The highway was designed to be a 4-lane asphaltic highway with the highest standard. The travel direction is divided by 4.6 to 5.1 meter raised median varying with its right of way. A total construction cost, including electrical and lighting system installation, is 628,997,580 baht.

Highway No. 33 is a part of Thailand major network connecting central and eastern regions together. The route starts from Suphan Buri Province and ends at Thailand/Cambodia border in Aranyaprathet district of Sa Kaeo province.



The project will greatly improve network capacity, mobility, and safety to support an increase of road transportation demand between central and eastern regions. The improvement will ultimately promote economic growth locally and nationally.



The construction project of Highway No. 3 section Trat – Hat Lek

Under the responsibility of Bureau of Highway Construction 2, the construction project of Highway No. 3 section Trat – Hat Lek has been completed. The construction took place from km. 430 – km. 454, located in the area between the main district and Khlong Yai district in Trat, with a total length of 23.5 kilometers. The Highway No. 3 section Trat – Hat Lek has been long served as a major transportation route in the region. With rapid increase of travel demand and traffic on the section, the DOH proposed the construction project to improve its capacity. The highway was upgraded to the highest 4-lane highway standard, which is a divided highway with raised median width of 4.6 meters. The roadway is asphaltic pavement with the lane width and shoulder width of 3.5 and 2.5 meters respectively. A total construction cost, including electrical and lighting system installation, is 903,266,000 baht.



The project helps improve the section mobility, accessibility as well as safety, which eventually enhances the efficiency of the road network. The better highway network will ultimately support economic growth and tourism in the area.

The construction project of Highway No. 212 section Wan Yai District – That Phanom District









Bureau of Highway Construction 2 is also in charge of the construction project of Highway No. 212 section Wan Yai District – That Phanom District. The project was designed to be a 4 lane highway from the existing 2 lane highway. The construction took place from km. 430 – km. 454, located in the area of three districts, Wan Yai District, and the main district in Mukdahan province, and That Phanom District in Nakhon Phanom Province, with a total length of 23.83 kilometers. Highway No. 212 is one of the major highway network in the North Eastern region linking multiple provinces such as Nong kai, Bueng Kan, Nakhon Phanom, Mukdahan, Amnat Charoen and Ubon Ratchathani together. It also serves as an international transportation route connecting three Thailand – Loa PDR Friendship bridges located in Nong kai, Nakhon Phanom, and Mukdahan. The project aims to mitigate transportation delay resulting from the increasing travel demand from both domestic and international transportation. To improve the capacity, efficiency and safety, the section was constructed to be a 4 lane highway with the highest standard. The roadway is asphaltic pavement with the lane width and shoulder width of 3.5 and 2.5 meters respectively. The travel directions are divided by a 4.6 meter raised median. A total construction cost, including electrical and lighting system installation, is 1,046,837,700 baht.

The project will enhance the highway network efficiency to accommodate freight transportation in the region. This help support the national policy to develop international trade among Thailand, Loa PDR, and China as well as helps promote economic activities and tourism in Thailand - Lao PDR border areas.

The construction of an elevated road over Highway No.35, Thonburi - Pak Tho **(Rama II road), Bang Khun Thian – Ekkachai Section**







Thonburi - Pak Tho Project, Bang Khun Thian – Ekkachai Section is a construction project of a 6-lane elevated road over Highway No.35 (Rama II road) with a total length of 8.3 kilometers. The project scope of work could be divided into 3 sections as follow.

Section 1 an elevated road at Sta.11+960 – Sta.14+535 Contract duration: 28 Aug 2019 – 11 Aug 2022

Section 2 an elevated road at Sta.14+535 – Sta.18+642 Contract duration: 28 Aug 2019 – 11 Aug 2022

Section 3 an elevated road at Sta.18+642 – Sta.20+295, including U-turn bridge at Sta.20+160 and bridges across highway No.35 Contract duration: 28 Aug 2019 – 11 Aug 2022

At present, travel from Bangkok to the south via National Highway No.35 has been facing heavy traffic congestion. The utilization in the corridor along both sides of the route also causes traffic congestion problem during morning and evening rush hours. This highway also has space limitations for road expansion, so the construction of an elevated highway will reduce traffic jams on Highway No.35. This elevated road also connected to current and future road networks, such as the western outer ring road, southern outer ring road, and the Expressway Authority of Thailand's network.



The construction project of Highway No. 24 section Ban Chan Junction – Det Udom District Part 2

Bureau of Highway Construction 2 is in charge of the construction project of Highway No. 24 section Ban Chan Junction - Det Udom District Part 2. The section is in the area of Kantharalak district in Sisaket province and Det Udom district in Ubon Ratchathani province. The alignment ranged from km. 352 to km. 363, and km. 364 to km. 375 with a total construction length of 22.93 kilometers.

The section was designed to be upgraded from 2 to 4 lanes with the highest standard. The roadway is asphaltic pavement with the lane width, inner and outer shoulder width of 3.5, 1.5 and 2.5 meters, respectively. The travel direction is divided by depressed median. A total construction cost, including 10 u-turns, 2 bridges, and electrical and lighting system installation, is 600,774,900 baht.



The project aims to enhance mobility, accessibility, and safety of the network as well as efficiency of logistics and transportation system. The improvement also helps promote growth in various economic sectors such as transportation, agriculture, tourism for both public and private, which eventually reflects social quality and quality of living.



The construction of Bang Pa-In – Nakhon Ratchasima Intercity Motorway (M6)

The Bureau of Bridge Construction has constructed a 4-lane elevated highway, Bang Pa-In – Nakhon Ratchasima Intercity Motorway, at Lam Takhong, Nakhon Ratchasima Province, Sta.125 – Sta.143, with a distance of 18 kilometers.

The project will connect the transportation between each region of the country, solve traffic problems, promote the commercial and tourism sectors, and increase the efficiency of the country's logistics network to be the transportation hub of the ASEAN region







International Highway Development



The objective of international highway development is to promote the economy and society in Asia. The road networks link capital cities, industrial areas, agricultural areas, ports, airports, distribution centres, and attractive cities in each country. Since the Bureau of International Highway Cooperation is aware of the importance of international highway development, the bureau has consequently encouraged the improving and developing international highway network to support the transport of goods and people through the participation in bilateral cooperation such as the cooperation between Thailand-Cambodia, Thailand-Lao PDR, Thailand-Myanmar and Thailand-Malaysia, as well as through the international cooperation including,

- Association of Southeast Asian Nations: ASEAN
- Greater Mekong Subregion Economic Cooperation: GMS
- Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy: ACMECS
- Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation: BIMSTEC
- Indonesia-Malaysia-Thailand Growth Triangle: IMT-GT
- United Nations Economic and Social Commission for Asia and the Pacific: UNESCAP

Focusing on the fiscal year 2020, there are several remarkable projects regarding international highway development implemented by the Department of Highways. For example,

1. The Opening Ceremony of the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River

The construction of the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River in Mae Sot District, Tak Province aims to mitigate traffic congestion and accelerate the cross-border freight transport by diverting the traffic from the First Thailand-Myanmar Friendship Bridge which is approximately five kilometers away. The Second Thailand-Myanmar Friendship Bridge is part of ASIAN Highway No. 1 (AH1) and supporting highway network of the East-West Economic Corridor (EWEC). As the bridge provides a better linkage between Mae Sot Special Economic Zone (Thailand) and Myawaddy Trade Zone (Myanmar), the project leads to the increase in international trade and economy among the member countries of GMS and the ASEAN Community.

The cost of construction for the Second Thailand-Myanmar Friendship Bridge is about 4,132 million baht, funded by grant aid of the Royal Thai Government. For construction, the project has adopted the prestressed segmental box girder structure and the total length of the bridge is 760 meters with a traffic changeover on the Thai side. The bridge's lighting system was inspired by the Thai Kranok pattern to demonstrate the delicacy of Thai artistic heritage together with the use of gold and green colours to reflect Myanmar's artistic identities.

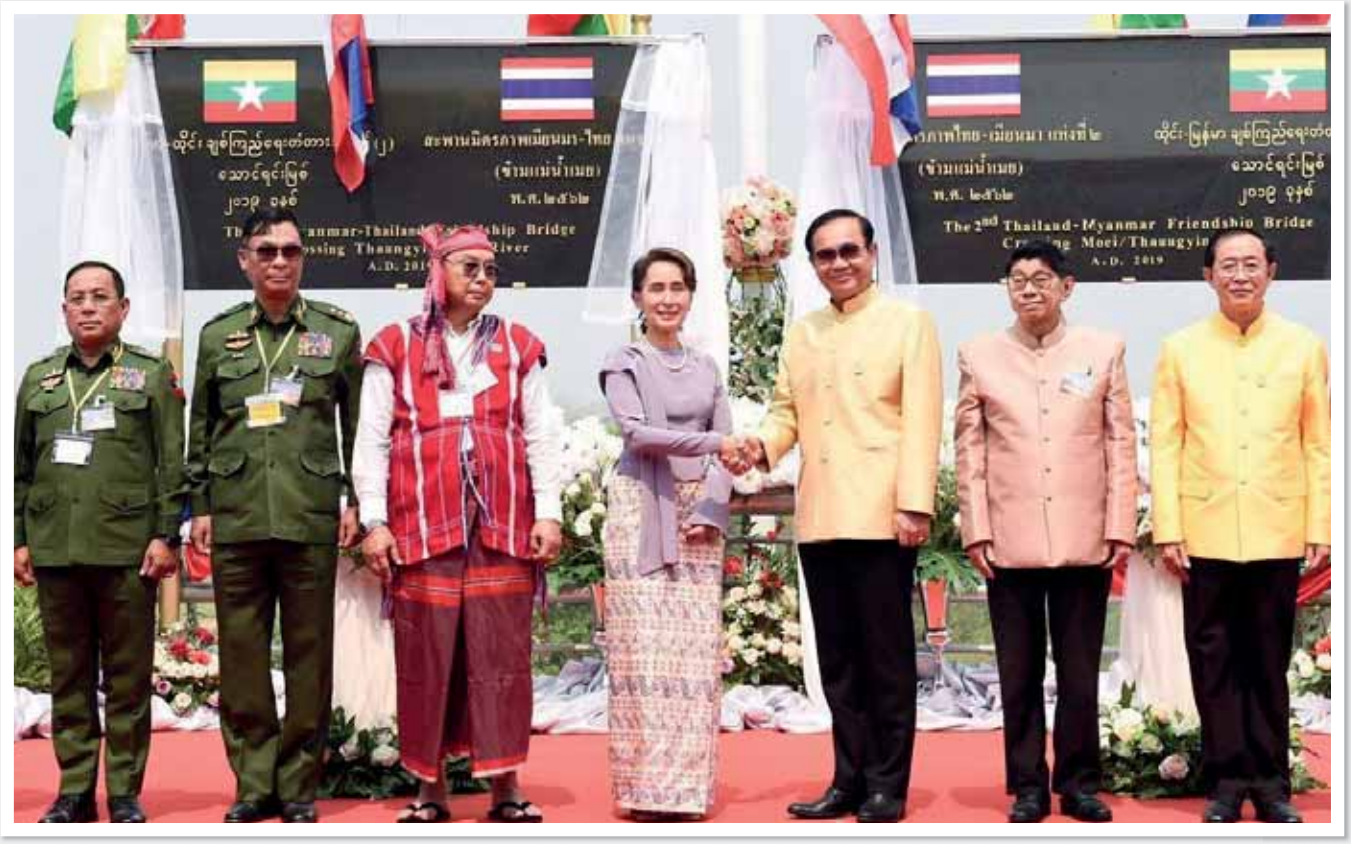
Project Background

6 October 2009- The Thai Cabinet approved in principle the construction of the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River in Mae Sot District, Tak Province.

2 June 2015 - The Thai Cabinet approved the Department of Highways to construct the Mae Sot Bypass and the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River.

30 August 2015- H.E. Mr. Somkid Jatusripitak, Deputy Prime Minister of Thailand and H.E. U Nyan Tun, Vice President of the Republic of the Union of Myanmar, co-chaired the Groundbreaking Ceremony for the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River.

10 September 2015 – H.E. Mr. Arkhom Termpittayapaisith, Minister of Transport of Thailand and Mr. Chusak Gaywee, Director-General of the Department of Highways signed the Agreement between the Government of the Kingdom of Thailand





and the Government of the Republic of the Union of Myanmar relating to the Construction of the Second Thailand-Myanmar Friendship Bridge Crossing Moei/ Thaungyin River with H.E. U Kyaw Lwin, Union Minister for Ministry of Construction of Myanmar.

30 March 2017- H.E. Mr. Arkhom Termpittayapaisith, Minister of Transport of Thailand and H.E. U Win Khaing, Union Minister for Ministry of Construction of Myanmar, presided over the Final Casting Ceremony at the connecting point on the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River.

19 March 2019- H.E. General Prayut Chan-o-cha, Prime Minister of Thailand, and H.E. Daw Aung San Suu Kyi, State Counsellor of Myanmar, presided over the Ceremony Marking the Completion of the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River in Mae Sot District, Tak Province, Thailand.

2 October 2019 - H.E. Mr. Saksayam Chidchob, Minister of Transport of Thailand and H.E. U Han Zaw, Union Minister for Ministry of Construction of Myanmar, signed the Agreement between the Government of the Kingdom of Thailand and the Government of the Republic of the Union of Myanmar relating to the Management, Maintenance and Use of the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River at the Ministry of Construction, the Republic of the Union of Myanmar.

30 October 2019- H.E. Mr. Saksayam Chidchob, Minister of Transport of Thailand and H.E. U Han Zaw, Union Minister for Ministry of Construction of Myanmar, presided the Opening Ceremony of the Second Thailand-Myanmar Friendship Bridge Crossing Moei/Thaungyin River.

2 Greater Mekong Subregion Highway Expansion (Phase 2) Project: Upgrading Highway No.22 Section Nong Han District- Pang Khon District and Section Sakon Nakhon – Nakhon Phanom, and Highway No.23 Section Roi Et -Yasothon

The Highway No.22 is part of Asian Highway No. 15 links to Thakhek (Lao People's Democratic Republic), Vinh (Socialist Republic of Vietnam), and the southern parts of the People's Republic of China. The upgrading of Highway No.22 is listed under the Four-Lane Widening Project for Arterial Highways (phase 2) as part of the Tenth network (Loei- Udon Thani- Sakon Nakhon- Nakhon Phanom) connecting the border crossing areas of Nakhon Phanom and Nong Khai, so the network considered as supporting network for the Special Economic Zones (SEZs) Development Plan (Phase2) (Nakhon Phanom SEZ and Nong Khai SEZ.

The upgrading of Highway No.23 is also listed under the Four-Lane Widening Project for Arterial Highways (phase 2) as part of the Sixth network (Nakhon Sawan - Chaiyaphum -Ban Phai District- Maha Sarakham - Roi Et - Yasothon - Ubon Ratchathani– Chong Mek). This network will strengthen the road link between the areas of Chong Mek border crossing in Ubon Ratchathani and the middle of the northeastern region and connect with EWEC as the network traverses through Highway No. 21 at Kaeng Khro District then links EWEC at Chum Phae District in Khon Kaen. Accordingly, the network help facilitating the transport of goods from the southern parts of the Lao People's Democratic Republic to the Republic of the Union of Myanmar.



The upgrading of Highway No.22 and No.23 intends to strengthen the road link between the neighboring countries and the production bases in Thailand which support Thailand's Transport Infrastructure Development Strategies 2015-2022. Likewise, the project also promotes the country's sustainable economic development that aligned with the 11th National Economic and Social Development Plan concerning economic reform for sustainable growth and enhancing the regional connectivity for economic and social security. This road improvement will strongly encourage the extensive road network under the GMS East-West Economic Corridor (EWEC).

The Greater Mekong Subregion Highway Expansion (Phase 2) Project on Upgrading Highway No.22 Section Nong Han district- Pang Khon District, Section Sakon Nakhon-Nakhon Phanom, and Highway No.23 Section Roi Et -Yasothon includes 124.9 kilometers with 6,808 million baht in investment (or approximately 194 million USD at an exchange rate of 1 USD = 35 baht) funded by Asian Development Bank (ADB)'s loan as the extension of the previous loan for Highway Expansion Project upgrades Highway No.12 from Phitsanulok to Lom Sak and Highway No.359 from Phanom Sarakham to Sa Kaeo which completed since 2002. The phase 2 project has commenced on 1 October 2018 and is expected to be completed by 2021. The status (as of September 2020) was ongoing with 87.774% progress.

It is noteworthy that to comply with ADB's safeguard policy, the projects have to carry out social development activities such as training programs for the communities and environmental management schemes. Thus, the Bureau of International Highway Cooperation had arranged not only the training sessions on road safety for enhancing road safety awareness with schools and communities but also the awareness-raising activities on HIV/AIDS and human trafficking. Moreover, all stakeholders have to follow the environmental mitigation measures stated in the Contractor's Environmental Management Plan (CEMP) in terms of air quality, water quality, and noise and vibration. Plus, the contractors have been trained to reduce impacts on the environment and society to provide efficient operation.

Inter – city Highway Development



The Extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway Project (M7)

Origin and Significance

The extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway Project (M7) is part of the 20-year intercity highway construction master plan, 1997 – 2016 (former version), according to the Cabinet Resolution on 22 April 1997 consisting of 13 routes with a distance of 4,150 kilometers. Subsequently, the Department of Highways revised and conducted the 20-year intercity highway development master plan, 2017 - 2036 (revised version), consisting of 21 routes with a distance of 6,612 kilometers. This project is one of the important strategies for connecting the Eastern Economic Corridor (EEC), Map Ta Phut Port, U-Tapao International Airport and Industrial Zone Petrochemical plants, gas, power, steel, chemicals, etc., and will be an important transportation route connecting Thailand's production and export bases which will help to build capacity for the Thai business sector in the future.

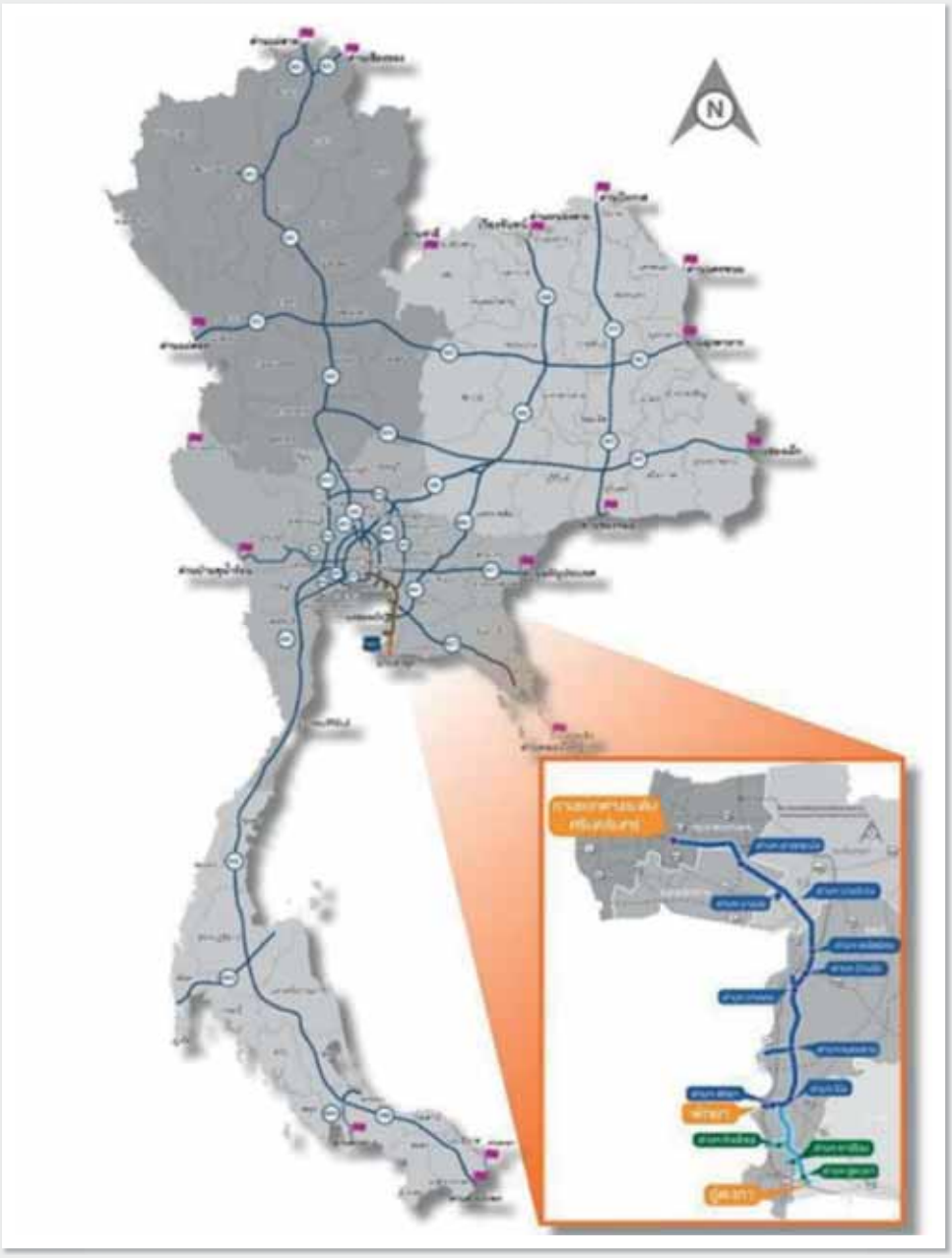






Project Description

The project is considered as the new pavement construction in accordance with the motorway standard with fully control access. The starting point for the project is located at the Mabpachan intersection, separating from the intercity motorway no.7, Chonburi - Pattaya section, passing Bang Lamung District, Sattahip District, Chonburi, and ends at Ban Chang District, Rayong, with a total distance of approximately 32 kilometers, designed as the 4-lane motorway with 3 closed system toll plazas (toll fee calculation is based on the actual distance used) namely Huay Yai Toll Plaza, Khao Chi On Toll Plaza and U-Tapao Toll Plaza and 2 rest areas, namely the Map Pachan Rest Stop and the Bang Lamung Highway Service Area. The route supports the Manual Toll Collection System (MTC) and Electronic Toll Collection System (ETC), which in the future can be developed into an automated non-barrier toll collection system or Multi-lane Free Flow (M-Flow). In this regard, the extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway Project, has provided electric lighting and Traffic Control Surveillance System to reduce the chance of accidents and help causing convenient and fast traffic. The Traffic Control Surveillance System consists of the Central Traffic Management Center (CCB), Variable Message Sign (VMS), Message Sign (MS), Emergency Telephone System (ETS) and Closed Circuit Television (CCTV) systems.)



The Extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway Project (M7) Location



The Extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway Project (M7) Map







The soft opening of extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway Project, on 22 May 2020

Performance

The Department of Highways has been driving the Intercity Motorway No.7 project, the extension of Pattaya - Map Ta Phut, continuously since 1989, which the Cabinet approved the project to be included in the development plan for the Eastern Seaboard area. The Department of Highways has conducted an engineering and economic feasibility study and the environmental impact assessment, arrangement of public participation, detailed survey and design, as well as studying investment plan and project financing sources respectively. The Cabinet passed a resolution on 14 July 2015 to approve the Department of Highways to construct the project using funds from toll collection for the construction costs of 14,200 million baht and fund from national budget for the land expropriation costs of 6,000 million baht. The use of fund from toll collection for the construction of this project of more than 10 million baht is considered as an investment model for infrastructure development in transportation that can greatly help reduce the burden of the national budget in developing the country.

The Department of Highways initiated the land expropriation in 2015, construction of civil works which divided into 13 contracts in 2016 - 2020, and 1 contract of toll gate construction and system installation works in the year 2018 - 2020 as well as conducting the Road Safety Audit at Pre-Opening Stage throughout the route.

On 22 May 2020, the Department of Highways held a soft opening ceremony, attended by the Minister of Transport, Mr. Saksayam Chidchob as the president, to allow people for trial service and test the functionality of systems by entering and exiting only at the U-Tapao Toll Plaza. Later, the Department of Highways has officially opened the service of all Toll Plaza throughout the Pattaya - Map Ta Phut section on 24 August 2020, with the Prime Minister General Prayut Chan-O-Cha presided over the opening ceremony of the extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway, which is one of the projects that the Ministry of Transport is trying to accelerate and drive to tangible success.

In this regard, the opening of the extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway, during the year 2020, the Department of Highways allow the public using the route for free, without collecting any toll fees. The toll fees are expected to be collected after the announcement of the Ministerial Regulation prescribing vehicle usage fees on the Bangkok - Ban Chang Intercity Motorway (M7) in early 2021. For the toll collection of the extension of Pattaya - Map Ta Phut Section of the Bangkok - Ban Chang Intercity Motorway Project, there will be both a Manual Toll Collection System (MTC) and Electronic Toll Collection System (ETC). The toll fees according to the actual distance used are classified as follows:

Vehicle Type	Toll Rate
 4-wheel vehicle	Toll fees according to the actual distance used: 1 Baht / kilometer The minimum toll is 10 Baht and the maximum for the entire route is 30 Baht.
 6-wheel vehicle	Toll fees according to the actual distance used: 1.6 Baht / kilometer The minimum toll is 15 Baht and the maximum for the entire route is 45 Baht.
 Vehicle with over 6 wheels	Toll fees according to the actual distance used: 2.3 Baht / kilometer The minimum toll is 20 Baht and the maximum for the entire route is 65 Baht.



Private selection according to the Private Investment in Public Affairs Act, B.E. 2556 for Private Investment in Operations and Maintenance (O&M) Bang Pa-in - Nakhon Ratchasima Intercity Motorway (M6) and Bang Yai-Kanchanaburi Intercity Motorway (M81)

According to the government's policy to promote private investment in the country's infrastructure development to reduce the burden of the national budget and the administrative burden of the government in the long run, and to encourage the private sector to bring out the experience and potential to increase efficiency in the implementation of public projects. The Department of Highways has therefore developed the Bang Pa-in - Nakhon Ratchasima Intercity Motorway (M6) and the Bang Yai - Kanchanaburi Intercity Motorway (M81) by the Public Private Partnership (PPP) in the form of PPP Gross Cost. The public sector invests in the construction of civil works and organizes the land ownership using the funds from the national budget. While the private sector is responsible for designing and investing in the construction of systems and other related elements as well as the Operation and Maintenance (O&M) of the project. The private property invested in construction as well as all income from the toll fees belong to the State. In this regard, the Cabinet passed a resolution on 22 August 2017 to approve the form of public private investment in both projects.

The scopes of work for joint investment in operations and maintenance (O&M) of the Bang Pa-in - Nakhon Ratchasima Intercity Motorway (M6) and the Bang Yai - Kanchanaburi Intercity Motorway (M81) which are divided into 2 phases as follows:

- Phase 1: Design and Construction (duration not more than 3 years) the private investors shall have duties and responsibilities in the design and construction of the system and other related elements, such as the toll collection system, civil works of the toll plaza, traffic management and control system, including a weighing station, central control building, data communication network system, power supply system, rescue buildings, etc.

- Phase 2: Operation and Maintenance (Duration not more than 30 years) the private investors shall have duties and responsibilities in the Operation and Maintenance (O&M) of all projects, including the administration of toll fee collection, convenience and safety for road users, traffic management and control, operational support for the Department of Highways and related agencies in traffic management and law enforcement, construction, renovation and maintenance of civil works and other related systems and components, procurement and maintenance of all project equipment and materials, including providing personnel with sufficient knowledge and expertise for their operations throughout the investment contract period in accordance with the requirements of the Department of Highways.

Nevertheless, private investors will receive remuneration in the construction cost, system work and other related elements, operating and maintenance costs according to the specified scope and conditions which requires an assessment of the performance of the private sector in accordance with the Service Level Agreement in accordance with the Performance-Based Specification for Operation and Maintenance. The operating and maintenance compensation will be reduced if the private sector is unable to meet the key performance indicator (KPI), such as the opening of traffic services, availability of the system, smoothness and stiffness of the pavement, the reflectance of the traffic line, traffic management in front of the toll plaza, access to the scene of the rescue service, repair damaged pavement, fixing and repairing electrical, lighting and equipment work within the specified period, the satisfaction of the road users, maintaining the International Standardization Organization (ISO), etc. In this regard, the Cabinet Resolution sets a limit for private investors to receive remuneration with the present value not exceeding the amount of 33,258 million baht for the Bang Pa-in-Nakhon Ratchasima route and 27,828 million baht for Bang Yai – Kanchanaburi route, respectively.

The Department of Highways, by the Selection Committee under Section 35 has proceeded to select the private sector in accordance with the procedures of the Private Investment in Public Affairs Act, B.E. 2556, by announcing the invitation of private investment on 8 February 2019 and distributing the Request for Proposal during February and March 2019. There are private investors from Thailand, Asian and European countries interested in purchasing Request for Proposal. There are 17 investors for the Bang Pa-in - Nakhon Ratchasima Intercity Motorway and 18 cases for Bang Yai – Kanchanaburi Intercity Motorway which when final submission date is due in both projects, there were 3 investors submitted the Request for Proposal. Based on evaluation of the proposals from private investors, the results showed that BGSR Joint Venture (BGSR), led by BTS Group Holdings Public Company Limited, in collaboration with Gulf Energy Development Public Company Limited, Sino-Thai Engineering and Construction Public Company Limited and RATCH Group Public Company Limited submitted proposals to seek lowest Present Value consideration and are the highest rating of both projects. The Selection Committee, under Section 35, has negotiated the draft contract and drafted an attachment to the contract. As of January 2020, the settlements were reached and thereafter the Cabinet at a meeting on 21 July 2020 passed a resolution approving the results of such private investment.

At present, the Department of Highways is in the process of preparing the entry into the Public Private Partnership contract with regard to operation and maintenance (O&M) of the Bang Pa-in - Nakhon Ratchasima Intercity Motorway (M6) and the Bang Yai - Kanchanaburi Intercity Motorway (M81), which is expected to enter into the Public Private Partnership contract by early 2021.

Highway Surveying and Design



Surveying and design are the first step of the Department of Highways Mission. The mission of Bureau of Location and Design not only design the infrastructure such as roads or bridges but also study and create the standard of highway roadworks according to the engineering principle in order to assure that others sectors who follow this standard can build an infrastructure in the same standard.

According to the National Economic and Social Development Plan, the mission of the Department of Highways have to follow the Transport Development Plan not only building the new route but also upgrading an existing route which are spread over the national road network such as the motorway projects, 4-lanes projects, interchange projects and highway safety projects.

On 10 – 11 September 2020, the Bureau of Location and Design launched a design exhibition under the theme "Developing network for the better life". The exhibition consisted of 8 topics as follows: Intersection design, Congestion improvement, New route design, Motorway design, International network, Architecture and landscape, and on-going projects.



The sixth Thai – Laos friendship Bridge project (Ubon Ratchathani – Sala Wan)

The sixth Thai – Laos friendship Bridge project (Ubon Ratchathani – Sala Wan) is the arch bridge with 2 lanes, there is 3.50 meter for driving lane and 2.00 meter for shoulder. There is the pedestrian walkways in both side with 1.55 meter width. The total length of the bridge is 1,670 meter. The border offices consist of many sectors such as Immigration office and Customs etc..

The Lan Chang architecture is applied to this project in order to make it simple and easy to construct. The project has originated from Km.23+180 on highway No.2112 which located at Ban Non Tan, Thailand run through the border control office and cross the Mae Khong River to Km.6+400 on highway No.11 which located at Ban Pak Taphan, Lakhon Pheng city, Sala Wan district, Laos.





Surveying and design of Inter-City Motorway No.9 project Bang Bua Thong – Bang Pa-in (West Corridor) section 1 and 2

This project has 6 lanes with 3 lanes frontage road in each side. The total length of the project is 40 Km. (section 1 is 23.5 Km. and section 2 is 16.5 Km.) The multilane free flow (MLFF) toll collection system will be applied to this project. There are three important interchanges in this project as follows: Lat Lum Kaeo interchange, Sam Khok interchange and Bang Pa-in interchange. The budget of the project consists of construction cost 29,300 million baht and compensation cost 3,500 million baht.

Especially, Bang Pa-in interchange is the major part that links the motorway networks together and complete the Bangkok ring road which help to increase a convenience and reduce the traffic time.

Land Acquisition



Land Acquisition Project for Construction of Highway No. 244 Entry to the Fifth Thai-Lao Friendship Bridge Crossing the Mekong River (Bueng Kan Province)

Background

Highway No. 244; Entry to the Fifth Thai-Lao Friendship Bridge Crossing the Mekong River (Bueng Kan Province); the Fifth Thai-Lao Friendship Bridge (Bueng Kan – Paksan) with network) is highway network development connecting with neighboring countries under Greater Mekong Subregion (GMS); Ayeyawady-Chao Phraya- Mekong Economic Cooperation Strategy: ACMECS) among Cambodia – Lao PDR – Myanmar – Thailand - Vietnam which is strategy on increasing of capacity in competition of Northeast; the group of Northern subregion, and strategy on development of Bueng Kan province and nearby province relating to international trade and investment in transportation linkage with Lao PDR for supporting higher volume of traffic and transportation.

Highway No. 244; Entry to the Fifth Thai-Lao Friendship Bridge Crossing the Mekong River (Bueng Kan Province) starts at km. 0+000 (at km. 123+000 of Highway No. 222 (Phang Khon - Bueng Kan); intersects by Highway No. 212 (Beung Kan – Nong Khai) at km. 125+000 and ends at km. 12+750 in Thailand; total length is 12.750 kilometers. The highway line cuts through Bueng Kan Sub-district, Wisit Sub-district, and Khai Si Sub-district of Bueng Kan District, Bueng Kan Province. This highway is under Royal Decree on Land Acquisition which announced in Government Gazette; Volume 133; Part 67A, dated 5 August 2016. Department of Highways approved land acquisition on 6 September 2016. Now, the land acquisition has been finished. There are 429 lands acquired with total compensation of 399,999,829 Baht. The land acquisition was taken





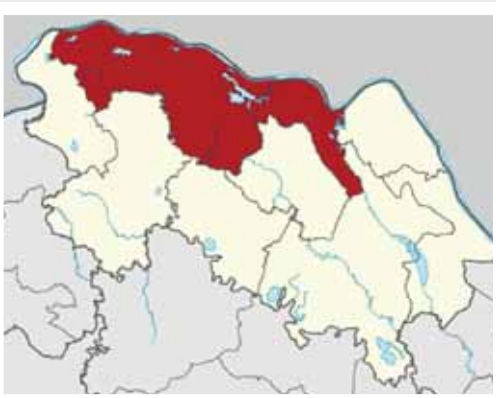
action under Expropriation of Immovable Property Act of 1987. On 30 May 2019, Expropriation and Acquisition of Immovable Property Act of 2019 was come into force; thus, the Expropriation of Immovable Property Act of 1987 was repealed. Section 65 of Expropriation and Acquisition of Immovable Property Act of 2019 stated that "Royal Decrees determining boundaries of land and Notification of the Office of the Prime Minister issued by virtue of the Expropriation of Immovable Property Act of 1987 and remaining in force on the day prior to the date on which this Act comes into force shall remain in force for the duration of the applicability of such Royal Decrees.

Operations pursued in the expropriation of immovable property under the Royal Decrees under paragraph one already carried out prior to the date on which this Act comes into force shall be valid while further operations shall be pursued in accordance with this Act." Department of Highways will take the action fairly and rapidly so it will affect much less people, decrease the conflict of people and will get their good cooperation. Moreover, the construction in the acquired land will be fast as planned.

Process

Bureau of Right of Way took action in land acquisition of highway no. 244; Entry to the Fifth Thai-Lao Friendship Bridge Crossing the Mekong River (Bueng Kan Province) in Bueng Kan Sub-district, Wisit Sub-district, and Khai Si Sub-district of Bueng Kan District, Bueng Kan Province. They are the lands which have documents of right (title deeds) and the lands which have no documents of right (possessory right) including public land (NSL.); the area is approximately 161.66 acres. For the lands which have documents of right, Bureau of Right of Way made immovable sale contracts and paid the compensation to the land owners. For the lands without documents of right, the bureau appointed the committee to conduct enquiries for ascertaining the people having right of these lands under Expropriation and Acquisition of Immovable Property Act of 2019 and posted notification in accordance with law and for decreasing the conflict between government and people including made sale contract and paid the compensation. For public land, the Bureau of Right of Way asked for permission to use land acquired and got the consent from the representatives of the government agency. About land acquisition, most of the land owners have good cooperation but few land owners are not satisfied with the compensation. Thus, Notification of the Office of the Prime Minister on Expropriation of Highway Number 244 for Urgent Case was issued and announced in Government Gazette; Volume 135; Special Part 322D, dated 17 December 2018. Moreover, the meeting to clarify about urgent need from government policy and criteria of land valuation as prescribed by laws.







Benefit

The land acquisition project was made as law and regulation prescribed by considering the benefit of people and country. It can be delivered to Bureau of international Highways Cooperation for construction of highway no. 254; entry to ... Now, it is in the process of construction under 3 construction contracts (3 parts). When the construction is finished, it will cause development in trade, investment, tour and travel, and international culture through this transportation between Thailand and Lao PDR and transportation network in ASEAN.

Video of the 5 th Thai-Lao Friendship Bridge (Brengkan-Bolikhamxay) (Highway No.244, Entry to the Bridge Crossing the Mekong River)

Performance with respect to Materials, Analysis and Inspection in Fiscal Year 2020



In 2020, the Bureau of Materials, Analysis and Inspection accomplished the outstanding tasks as follows:

1. Preparation of Standard Draft Method for the Liquid Limit (LL) Test of Soil Using the Cone Penetrometer

The water content of the soil influences the change in soil qualification in terms of changes in material status and engineering qualifications. The water content in the soil when it is transforming from liquid into a viscous substance in a plastic state called Liquid Limit (LL), which is the value used for classifying soil types and determining soil qualification for road construction of the Department of Highways.

The Department of Highways used Liquid Limit test according to the Tor Lor. 102/2515 which improved from Casagrande Method of ASTM D 423-66. The method is to mix the soil with different water content in a pan-shape container and made a hole in the center, then, tapped the container at a constant speed until the clay slid and met at 1/2 inch. The number of taps and the water content used to plot the relative graph. The status where the water content at the 25th tap is called Liquid Limit.

To determine the soil Liquid Limit by Casagrande Method, soil samples were tested at different water amount at least 4 times, hence, the test takes generally 1 to 3 hours to finish. Furthermore, it also requires expertise in the test as the testing results might be easily deviated which would affect the classification of soil types and the selection of soils used in road construction. To reduce such deviation, the Liquid Limit was studied using the Cone Penetrometer compared with the Liquid Limit from the Casagrande Method to verify the accuracy and validity of the application.

The Bureau of Materials, Analysis and Inspection, by the Pavement Structure Inspection and Guidance Division, has studied and drafted a standard for determining the Liquid Limit by using the Cone Penetrometer in accordance with BS 1377 standard. Under this test, the Liquid Limit of soil is the water content which makes 80 grams with an angle of 30 degrees cone shape freely submerged into the soil mass of 20 millimeters in 5 seconds. The soil samples were the soil used in the Department of Highways construction project. The result of test was compared with the Liquid Limit obtained from the Casagrande method. The test results for Liquid Limit were similar. The result of Cone Penetrometer test had little deviation which is more accurate value. Under this test, it is found that the Liquid Limit of the soil can be found more quickly, and the results were consistent and accurate. It also reduced the human error which enhances the confidence in the use of the test results in the material quality control of the road construction project.

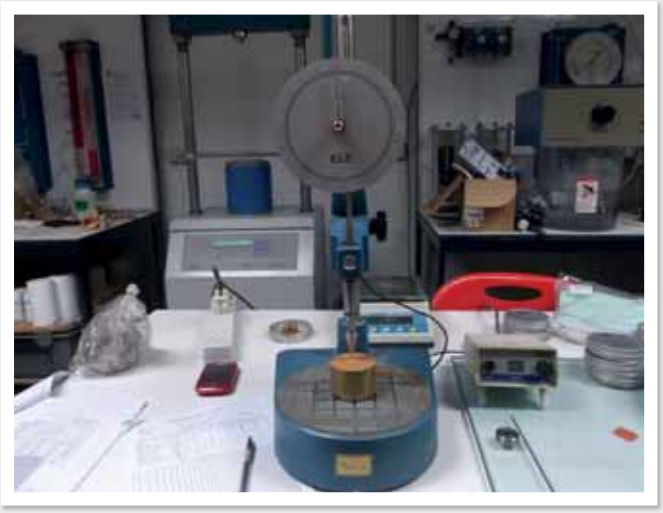


Figure 1: Cone Penetrometer

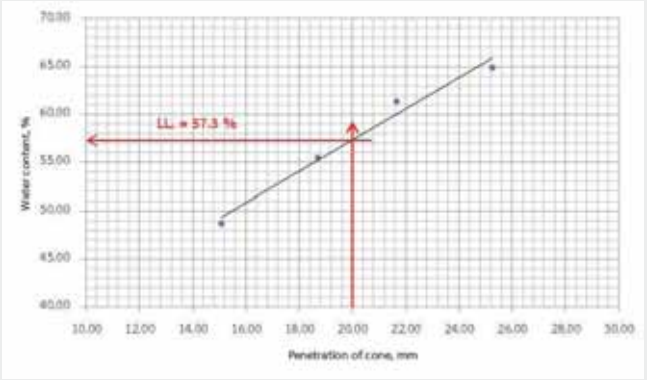


Figure 2: The results of the Liquid Limit test using the Cone Penetrometer Method

2. Guidance Design for Road Structure using Joint Plain Concrete Pavement (JPCP)

The Portland concrete pavement is a rigid pavement due to its high modulus of elasticity, resulting in very little deflection when weight is applied on the pavement as it will bear the weight in the same way as the plate, thus allowing the weight to be distributed from the traffic into the subgrade on a wide area. As a result, the stress on the subgrade is low. Therefore, in designing the Portland concrete pavement structure, materials for the sublayer under the pavement, quality of concrete, traffic volume, geometric design, thickness of pavement and joints must be considered. The joints are intended to use in crack control which facilitates the construction, controlled the movement and transfer the load from traffic between the concrete slabs.

The concrete pavement shrinkage due to friction between the concrete pavement and base layer causing cracks as shown in Figure 3. The distance between the cracks are approximately 12 to 45 meters depending on the climate conditions after construction. Also, the base layer will have the curling and warping effect, and the traffic load will cause cracks as shown in Figure 4. Therefore, the pavement softening point must be defined in the Portland cement concrete pavement to lead the cracks in the desired area according to Figure 5, where the traffic load transfer is performed between joints which can be achieved by the aggregate interlock and/or dowel bars, which is the smooth round steel.

The Department of Highways constructed the first concrete pavement in 1960 at Highway no.1, from the Victory Monument – Ladprao. The construction was done on the subbase layer of aggregate material, without the base layer of sand material. The transverse joint spacing was 6 meters with a road distance of approximately 6 kilometers and opened to traffic in 1964, which was still in good condition and no pumping problems were found. Later, the second concrete pavement was constructed on Bangkok - Nakhon Pathom route. The construction was done on the subbase layer of aggregate material. The transverse joint spacing is 36 meters with a road distance of approximately 41 kilometers. This road had pumping problems shortly after construction. As a result of the pumping of this road, the structural designers of this road at the time of construction who was a foreign civil engineer recommended the Department of Highways to construct the concrete pavement with a base layer of sand to prevent pumping and blowing. In this regard, the Bureau of Materials, Analysis and Inspection, by the structural design engineers, suggested that the concrete pavement at 36 meters transverse joint spacing would suffer more shrinkage from the environment than at 6 meters transverse joint spacing and thus it might be another reason that caused the pumping and blowing.

In 1995, the Department of Highways created the Portland concrete pavement standard. For the concrete pavement thickness of 230 and 250 millimeters, the dowel bars were used to transfer traffic load at joints. The dowel bar is a round bar SR24 according to TIS 20 with a diameter of 25 millimeters and with 300 millimeters dowel bar spacing. In the Standard Drawing for Highways Design and Construction (2015), the Department of Highways has changed dowel bars specification to round bar with AASHTO M36 Grade

60, a diameter of 30, 32 and 35 millimeters for the concrete pavement with thickness of 230, 250 and 280 millimeters, respectively and with a round bar spacing of 300 millimeters. Nowadays, the Department of Highways has designed the Portland concrete pavement on the various base layer materials of such as crush rock, sand, soil cement and asphalt concrete, etc.

In 2005, the American Concrete Pavement Association (ACPA) conducted a questionnaire for government agencies which were responsible for road infrastructure in the United States and Canada. It was found that the JPCP was used primarily for road construction as shown in Figure 6. However, many states in the United States do not use the JPCP, such as Texas (TXDOT, 2018) due to transverse joint maintenance problems.

The JPCP are not reinforced with steel. Thus, the transverse joint spacing is less than 15 feet (4.6 meters), resulting in minimal shrinkage due to climate conditions. As the width of the crack is narrow, it causes less water permeability from the pavement surface to the substructure, therefore has a longer service life (FHWA, 2007).

The Bureau of Materials, Analysis and Inspection has designed the Portland cement concrete pavement structures for the fiscal year 2020 as follows:

1. Construction project on Highway no.2, Khon Kaen - Hin Lat Village, from km.336+786 to km.360+828 in parallel lanes;

2. Construction project on Highway no.3471, Bang But Subdistrict - Chumsaeng Subdistrict, from km.27+920 to km.28+760;

3. Highway construction project on Highway no.11, In-Buri Intersection - Sak Lek District, from Thap Khlo District - Sak Lek District, km.142+000 to km.172+900.

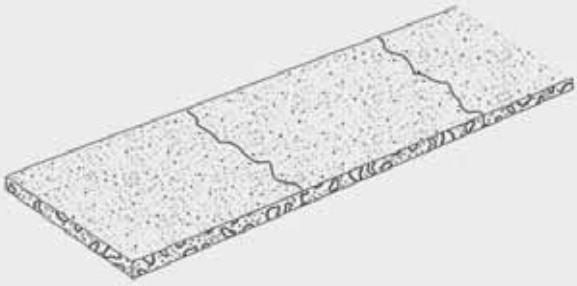


Figure 3: Primary Non-Jointed Pavement Crack after the Construction

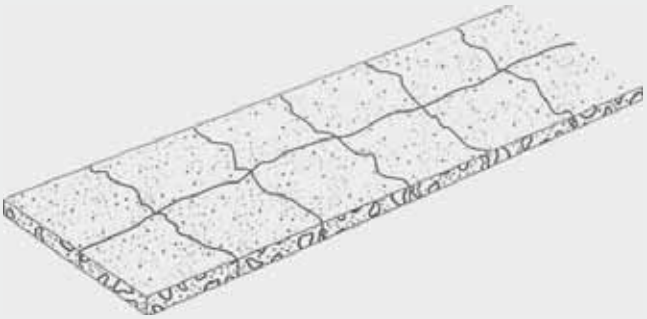


Figure 4: Non-Jointed Pavement Crack due to the Environment Condition and Traffic Load

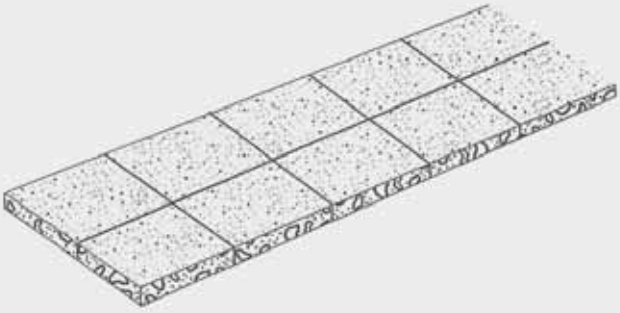


Figure 5 Properly Jointed Pavement

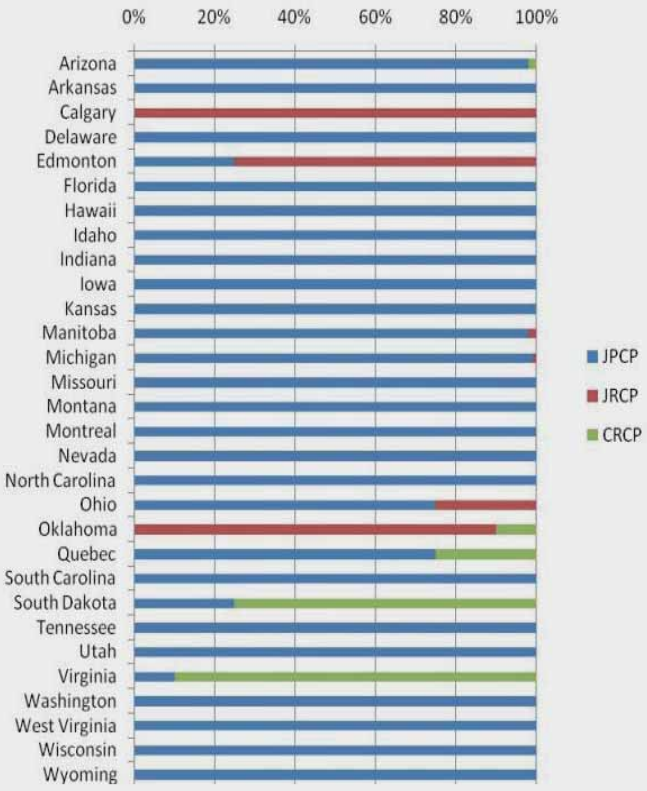


Figure 6: ACPA Questionnaire Results (ACPA, 2005)

3. Investigation of an Accident Causes During Rain with a Skid Resistance Tester, Fix Slip Friction Test, Model ASFT T-10, on Continuous Pavement, with Solutions

"Skid resistance" is an important feature of pavement surface which directly affects the safety of the road users, especially during the rainy season. According to the study, it was found that pavement friction or pavement-tire friction or skid resistance is one of the factors affecting road safety, especially the risk of wet-skidding crashes due to slippery roads in case of wet roads, which found that the likelihood of such accidents decreased as the friction between the tire and the pavement increased (Moyer, 1959). However, skid-related crashes are caused by many factors, such as road geometry, traffic condition, vehicle speed, driver's behaviour and climatic conditions, etc. Thus, the wet pavement is one of the many factors that can cause such accidents. From the study of the anti-slip resistance criteria by the Department of Highways to ensure safety for road users, it can be divided into 2 levels as detailed in the table.

Level Criteria*	IFI	*	BPN
Investigatory Level	0.32	0.43	42
Intervention Level	0.25	0.29	30

**Research and analysis project on pavement friction to develop indicators and improve the safety of road work by the Bureau of Materials, Analysis and Inspection , the Department of Highways.*

- Investigatory Level refers to the degree at which the friction rate begins to decline significantly. This is an area where the road user should be cautious and a warning label may be installed. Moreover, the frequency of road surface inspection should increase or the short term improvement should be done.

- Intervention Level refers to the level at which the friction value of the route should be urgently improved.

Factors of surface roughness characteristics which affecting the pavement's skid resistance are the level of roughness, namely, Micro-Texture, Macro-Texture and Mega-Texture as shown in Figure 7.

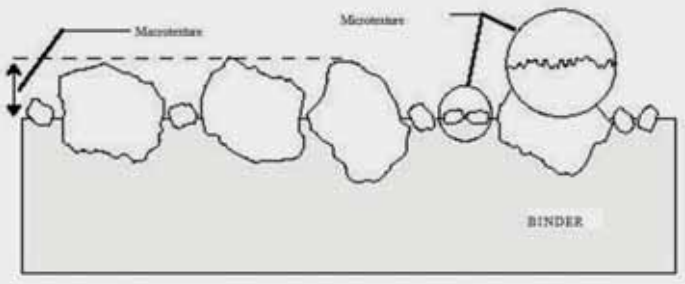


Figure 7: Road Surface Characteristics (Source: Tremblay, 1995)

At present, the Bureau of Materials, Analysis and Inspection, by the Road Condition Survey and Assessment Division, has been frequently coordinated by many highway district divisions regarding the problems of accidents from slipping in the rain. The Bureau of Materials, Analysis and Inspection has therefore sent a Pavement Skid Resistance Inspection Unit with the Continuous Type Slipping Resistance Tester, Model ASFT T-10, to verify the quality of the skid resistance whether it is in accordance with the safety regulations implemented by the Department of Highways.



Figure 8: The Continuous Type Slipping Resistance Tester, Model ASFT T-10

The ASFT T-10 tester is tested on a wet road surface to simulate the skid resistance and the brake in rain condition, using the rotation of the test wheels with a slip percentage of 13% and measure the torque level from the tested wheels to process the friction value according to ISO 8349. The test speed was approximately 60 km/hr.

After investigating the accidents caused by slipping on the concrete pavement in the rain, most of the pavement surface was glossy as shown in Figure 9. The glossiness might result from the construction as the cement powder was used to absorb moisture from the concrete surface due to rain while construction or the pouring of concrete and adjusting the concrete surface.



Figure 9: The Glossy Characteristic of Concrete Pavement Surface

As a consequence, an ultra-high pressure washer, as shown in Figure 10, was used to create re-texturing at the micro texture level, as shown in Figure 11, to improve the pavement's skid resistance quality.

According to the study, it is found that the ultra-high pressure washer with the pressure of 36,000 PSI can create the re-texturing at micro texture level which increases resistance to slipping of the pavement in accordance with the regulations of the Department of Highways. The before-after comparison is shown in Figure 12. Moreover, such pressure washing for creating roughness on the pavement can also work quickly which is suitable for modifying in large workloads.





Figure 10: The Ultra-high Pressure Washer with the Pressure of 36,000 PSI



Figure 11: The Road Surface which has the Micro Texture Roughness Characteristic Level

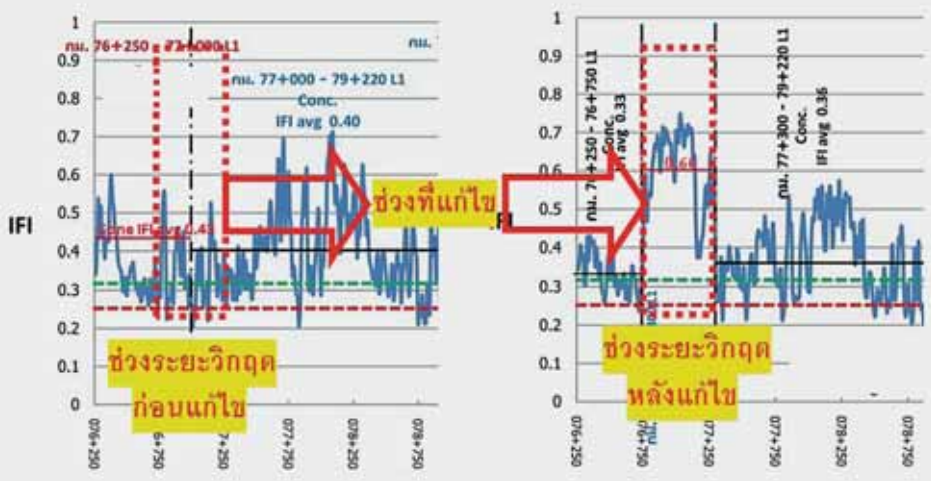


Figure 12: Graph showing IFI comparison before and after corrective action

4. The Study of Thin Layer Asphalt Concrete (TLAC)

One of the popular methods for maintaining roads in good conditions and ready for road users is the milling and paving back with new pavement and applying the red anti-skid which has a relatively high price. Therefore, the Bureau of Materials, Analysis and Inspection, by the Asphalt Pavement Design and Inspection Division, has adopted the concept of a Thin Layer Asphalt Concrete (TLAC) to achieve standardized slip resistance and it is less expensive than the pavement made by using red anti-skid.

The Thin layer Asphalt Concrete (TLAC) is an ultra-thin asphalt pavement, approximately 20 to 30 millimeters, which is a thickness that is in between the chip seal (SST) pavement and thin overlay pavement, consisting of 2 parts:

- The first layer which is the interlayer which is the layer bonded and connected by tack coat by modified asphalt emulsion (CRS-1P).

- The second layer which is the gap graded modified asphalt concrete wearing course

The areas suitable for using Thin layer Asphalt Concrete are new pavement construction, maintenance area, danger working area, height limit working area. It is expected that the application of the Thin layer Asphalt Concrete will improve pavement stiffness, increase the braking distance, accelerate the flow and drainage on the pavement, reduce waterlogging on the road surface and back splashing of water, reduce traffic noise and slow down the rutting.

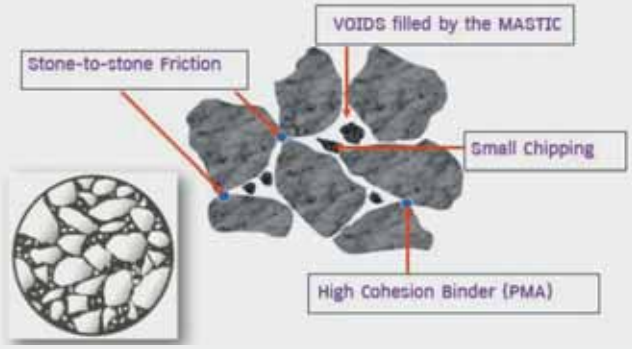




Figure 13: Thin Layer Asphalt Concrete (TLAC)



Figure 14: Thin Layer Asphalt Concrete Surface

Road Research and Development



Dechatiwong Bridge

Study of Rehabilitation Framework for Historic Bridges Constructed prior to 1957

The Bureau of Road Research and Development, together with the Bureau of Location and Design, the Bureau of Highways Maintenance Management, and Nakhon Sawan Highway District 1 have inspected the structure of Dechatiwong Bridge after 70 years of use. Currently, the bridge is restricted to use, but it is still an important bridge for the transportation of Nakhon Sawan Province. To study and rehabilitate the bridge's structure, various methods were used, i.e., the study of bridge behaviours under load tests, structural analysis using finite element model, probability and statistical analysis to calculate the safety index of structures, to ensure that the study results can be used safely, sustainably, and reduce the burden of future maintenance for the design of the bridge rehabilitation.



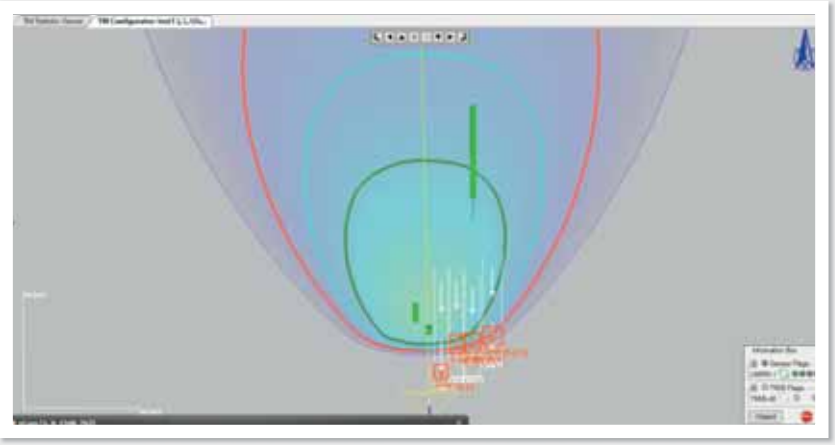
Dechatiwong Bridge is among the first country's Bridges built across the Chao Phraya River; therefore, it is a historic bridge that is worth preserving. If it can be rehabilitated to use according to the current design standards, it will be a valuable engineering's building in Thailand



Data collection at the U-turn of Highway No.331, Sattahip - Khao Baisi Sta.1+600



Traffic counting using CCTV cameras



Distance measurement between vehicles using Microwave Radar

The U-turn improvement project to improve the highway safety standards

At present, the Department of Highways is trying to reduce the chance of accidents that occur at the U-turn on the road median by designing a solution to the problem at the U-turn on the central median in various forms, e.g., an arrangement of traffic lanes to prevent direct traffic collisions, diverting direct traffic, increasing the turning radius of a U-turn, making a separation between the vehicles in both directions. The pattern and concept of the U-turn designs should be further analysed to create a standard model that corresponds to the physical and traffic characteristics of various forms of road.

The project studied design principles of various U-turn types from both Thailand and abroad to find a design solution which suitable for Thailand, and can be used as a guideline for improving the existing U-turn and a U-turn to be built in the future. Also, the project has summarised and presented various models of the U-turn that are suitable for the physical characteristics and traffic volume of different road sizes to ensure the most flexibility and safety to road users. The results of this study will be increase safety standards for highway users in the future.



Traffic Counting using Image Processing



A bridge across Lat Phrao Intersection

Structural integrity and fatigue evaluation of steel bridge across Lat Phrao intersection

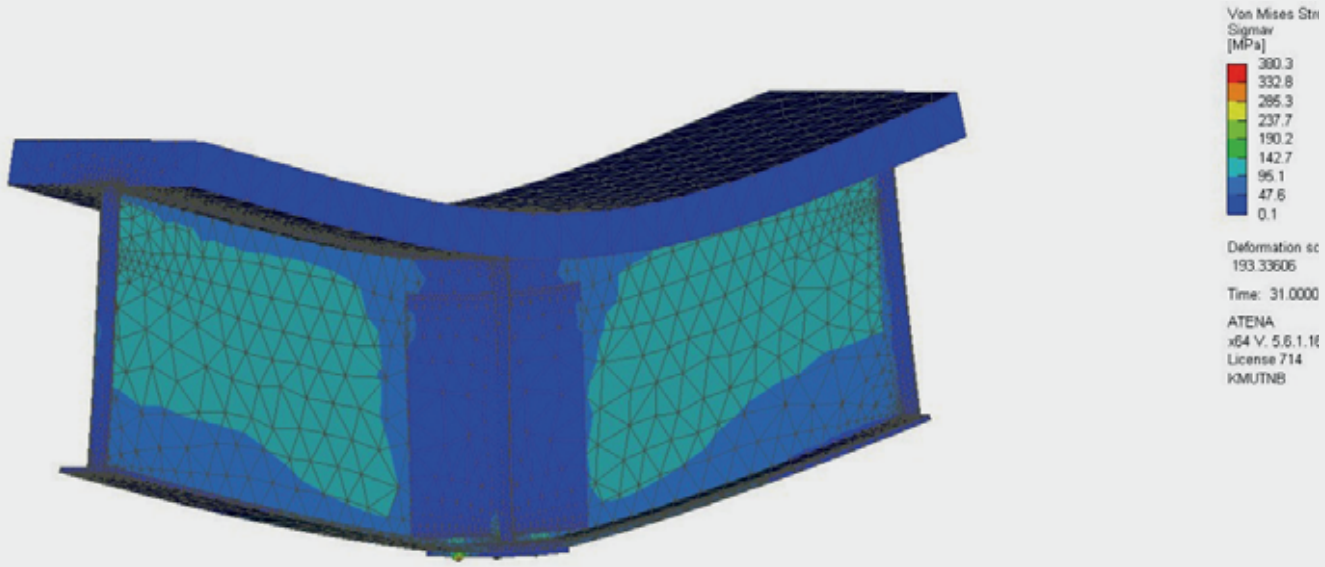
Steel structure bridges are more susceptible to fatigue than concrete structure bridges, so the effects of cumulative fatigue from traffic can damage the steel bridge. Therefore, the Bureau of Road Research and Development, together with the Bureau of Location and Design, the Bureau of Highways Maintenance Management, and Bangkok Highway District have inspected the fatigue resistance of the steel bridge structure at Lat Phrao Intersection, both inbound and outbound of Vibhavadi Rangsit Road, after 14 years of use. Non-destructive techniques, Finite Element analysis, AASHTO LRFD (2010) code-based, and field observation-based fatigue evaluation were used in this evaluation.

The structural integrity evaluation found that the bridge structure has good integrity, but has limited fatigue capacity. Therefore, The Bureau of Road Research and Development has adopted the concept of Safety Index to assess the bridge structures, to make a bridge reinforcement plan following AASTHO LRFD (2010) design standards.

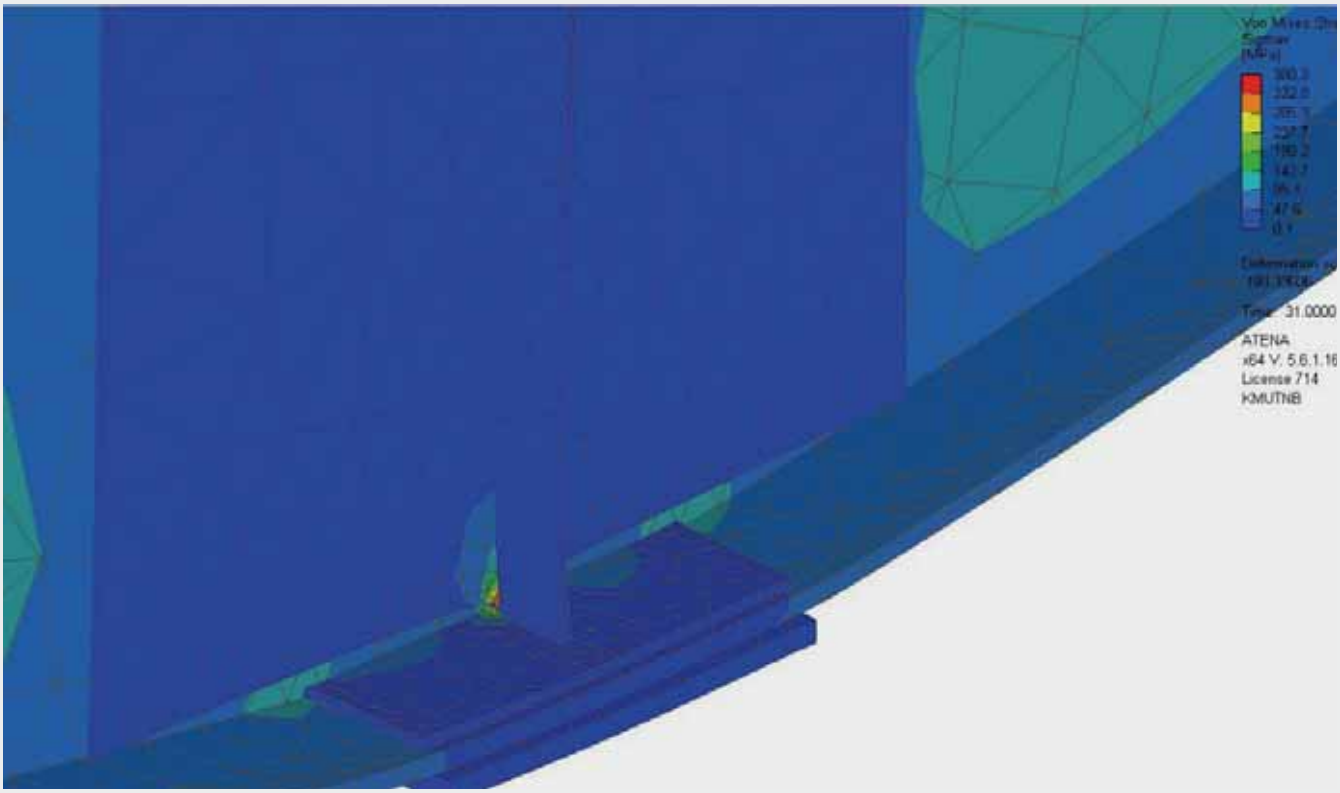


Restoration of the bridge across Lat Phrao Intersection

In-Depth inspection of steel bridge at Lat Phrao Intersection is the first bridge inspection by the Bureau of Road Research and Development which integrated research and design, leading to sustainable the steel bridge's restoration and maintenance.



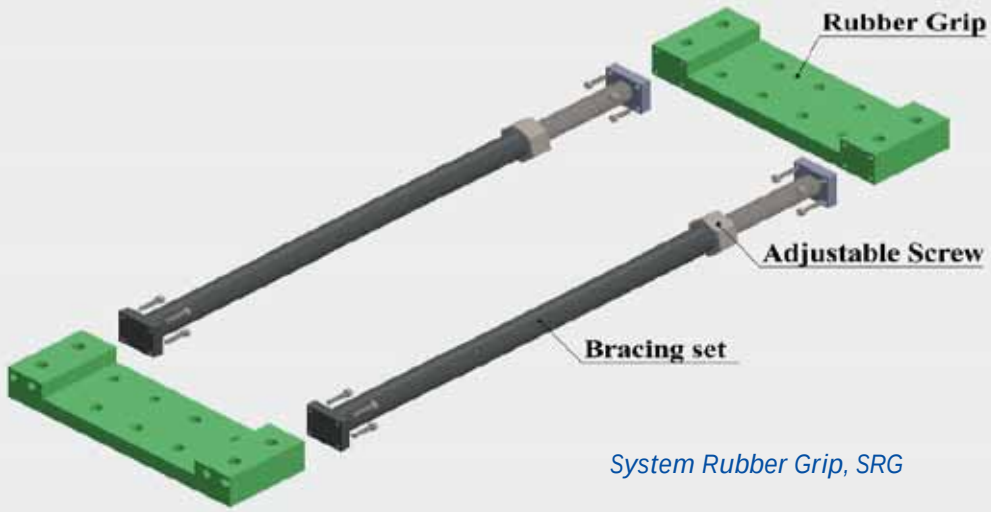
An analysis of bridge girder with finite element models



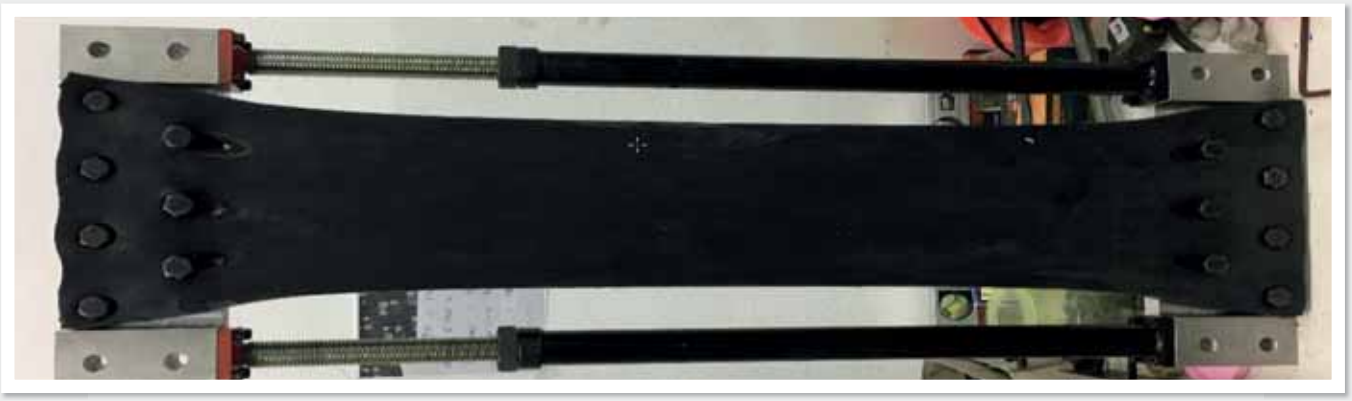
An analysis of bridge girder with finite element models

The use of System Rubber Grip (SRG) to solve the pier fractures problem caused by chloride

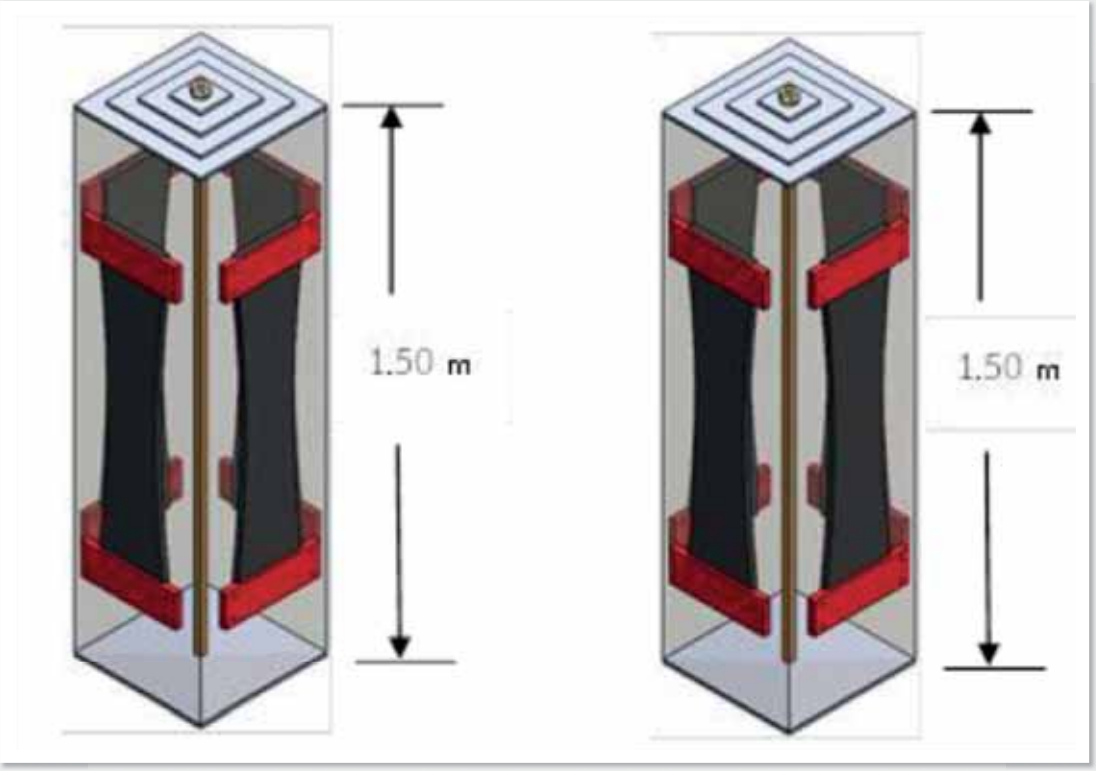
The purpose of this project was to use System Rubber Grip (SRG), natural rubber which used as post-tensioning materials, to solve the pier fractures problem caused by chloride diffusion. The SRG is a Bureau of Road Research and Development's innovation to strengthen bridge girder by pulling a plain bearing pads size 20 x 100 x 4 cm to be stretched to create tensile force. It is then attached to the structure to transfer the force into the structure. Application of using the SRG to solve the problem of pier fracture due to chloride diffusion is possible for several reasons. The first reason is that the rubber has resistant to chloride. Secondly, pre-stressed rubber strips are of the right shape and size for installation on bridge pier bent. Thirdly, the stretch of the rubber strip can be designed to meet the required compressive stress. Fourthly, rubber strips are made of domestic materials, so they are inexpensive. Finally, as a by-product, pre-stressed rubber strips can strengthen a bridge pier. However, using SRG to solve the pier fractures problem due to chloride is a new solution, it is necessary to study both the design analysis and the ability to slow down the infiltration of chloride into the concrete before further use.



System Rubber Grip, SRG



System Rubber Grip, SRG



The installation of the SRG with pier bent for testing



The installation of the SRG with pier bent for testing in a laboratory

Cooperation projects with other agencies Guidelines for the development of pavement structures using deflection data from the FWD and LWD test.





Falling Weight Deflectometer and Light Weight Deflectometer

The Bureau of Road Research and Development, Department of Highways and Bureau of Road Maintenance, Department of Rural Road has exchanged academic knowledge on the development of pavement structures about deflection data from the Falling Weight Deflectometer and Light Weight Deflectometer test results. Both approaches are Mechanistic Design approach focusing on mechanics properties according to actual usage conditions, traffic conditions, vehicle weight and road environment.

To unify the database and road structure design standards throughout the country which leads to the development of Big Data, Data Analytics and artificial intelligence systems, the Department of Highways and the Department of Rural Roads are currently in the process of preparing a Memorandum of Understanding on the information integration.

Guidelines for developing highway safety systems to support connected and autonomous vehicles (CAVs) technology

The Bureau of Road Research and Development, Department of Highways has held a meeting with the working group of the National Science and Technology Development Agency (NSTDA) on the development of self-driving vehicles. NSTDA offers directions and status for the development of CAVs in Thailand, while the Department of Highways is well equipped with knowledge, personnel and testing sites. This partnership is organised to develop the potential of autonomous vehicles, to reduce dependence on imported technology from abroad, and to prepare for the development of infrastructure to the smart highway in the future.

Guidelines for developing **Artificial intelligence (AI) to** examine bridge structure

The Bureau of Road Research and Development, Department of Highways in collaboration with Technopreneurship and Innovation Management Program, Chulalongkorn University are developing artificial intelligence technology to monitor the bridge structure, which will reduce the discretion of the bridge inspector, making the bridge assessment more accurate and faster.

Currently, a mobile application is being developed for photographing bridge damage, which will facilitate DOH's staff in the future.

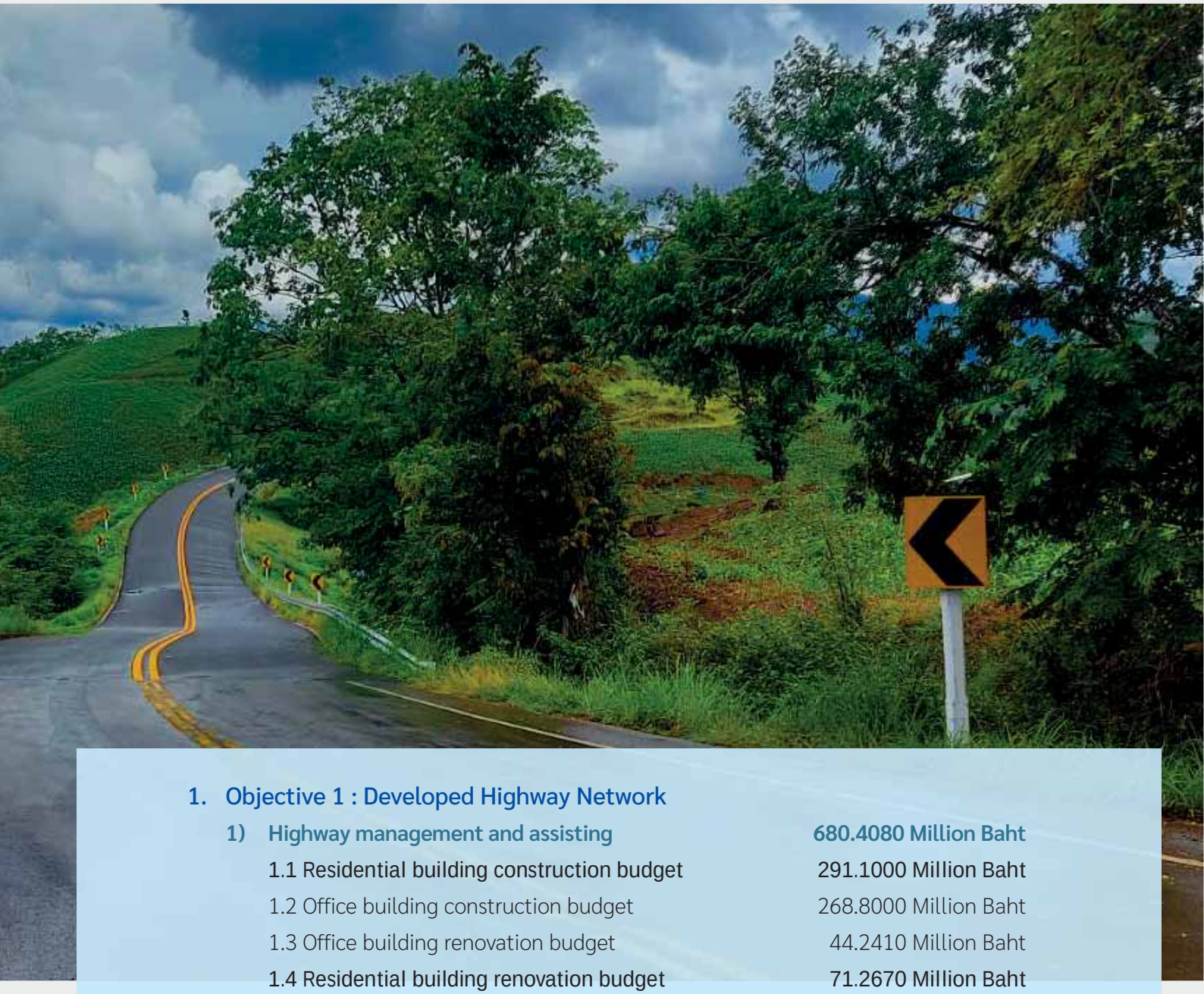




The report of Highway Maintenance in 2020

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

In fiscal year 2020, DOH received the budget for maintaining the network around 24,602.5206 Million Baht which were allocated in many activities as followed;



1.	**Objective 1 : Developed Highway Network**	
	1) Highway management and assisting	**680.4080 Million Baht**
	1.1 Residential building construction budget	291.1000 Million Baht
	1.2 Office building construction budget	268.8000 Million Baht
	1.3 Office building renovation budget	44.2410 Million Baht
	1.4 Residential building renovation budget	71.2670 Million Baht
2.	**Objective 2 : Maintained Highway Network**	
	1) Highway maintenance activities	**20,189.1626 Million Baht**
	1.1 Routine maintenance	5,646.0000 Million Baht
	1.2 Periodic maintenance	5,025.2576 Million Baht
	1.3 Special maintenance	7,686.6570 Million Baht
	1.4 Rehabilitation activities	1,831.2480 Million Baht
	2) Urgent maintenance	**200.0000 Million Baht**
3.	**Inter-Region Maintenance Project**	**3,493.4955 Million Baht**
4.	**Survey and Evaluate Highway network Project**	**39.4545 Million Baht**

The budget for highway maintenance activities is as followed

1. Routine Maintenance The objective of routine maintenance is to keep the roads and bridges in good condition for serving the road users. Types of routine maintenance are as follows:

1.1 Pavement Maintenance

1.1.1 Maintenance of Asphalt Pavement

- Crack Filling
- Surface Sealing
- Surface Leveling
- Skin Patching
- Deep Patching
- Surface Grinding

1.1.2 Maintenance of Concrete Pavement

- Repair of Joint Sealing
- Crack Sealing
- Concrete Pavement Leveling
- 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

1.3.1 Drainage System

- Maintenance of Open Channel
- Maintenance of Culvert



1.3.2 Bridge and Structure

- Maintenance of Bridge and Structure
- Repair of Bridge Approach
- Repair of Retaining Structure
- Repair of Pedestrian Bridge or Underpass
- Repair of Tunnel

1.4 Traffic and Safety Device Maintenance

1.4.1 Maintenance of Traffic Sign and Marking

- Repair of Traffic Sign
- Traffic Painting and Marking

1.4.2 Maintenance of Safety Device

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

1.4.3 Maintenance of Road Lighting and Traffic Signal

- Maintenance of Road Lighting
- Maintenance of Traffic Signal

2. Periodic Maintenance

The objective of periodic maintenance is to expand the surface lifetimes and increase the strength of the surface in order to serve the traffic in the future. Types of periodic maintenance are as follows:

2.1 Asphalt Seal Coating

2.2 Asphalt Overlay

2.3 Replacement of Joint Sealing



3. Special Maintenance

The objective of special maintenance is repairing the road damage which cannot maintain by the routine maintenance work. Types of special maintenance are as follows:

3.1 Surface Leveling

3.2 Major Repair of Asphalt Pavement

3.3 Asphalt Hot Mix Recycling

3.4 Major Repair of Concrete Pavement

4. Disaster rehabilitation activities

Disaster rehabilitation activities are the maintenance project for road that fail from the disasters such as flooding, storm, land slide or another disaster. In 2020, Thailand was hit by many storms such as Sinlaku, Higos, Linfa etc. which made a major damage to the highway network.



5. Urgent maintenance

Urgent maintenance is the quick maintenance works from the unpredicted disasters such as flooding, storm, land slide or another disaster in order to open the traffic rapidly.

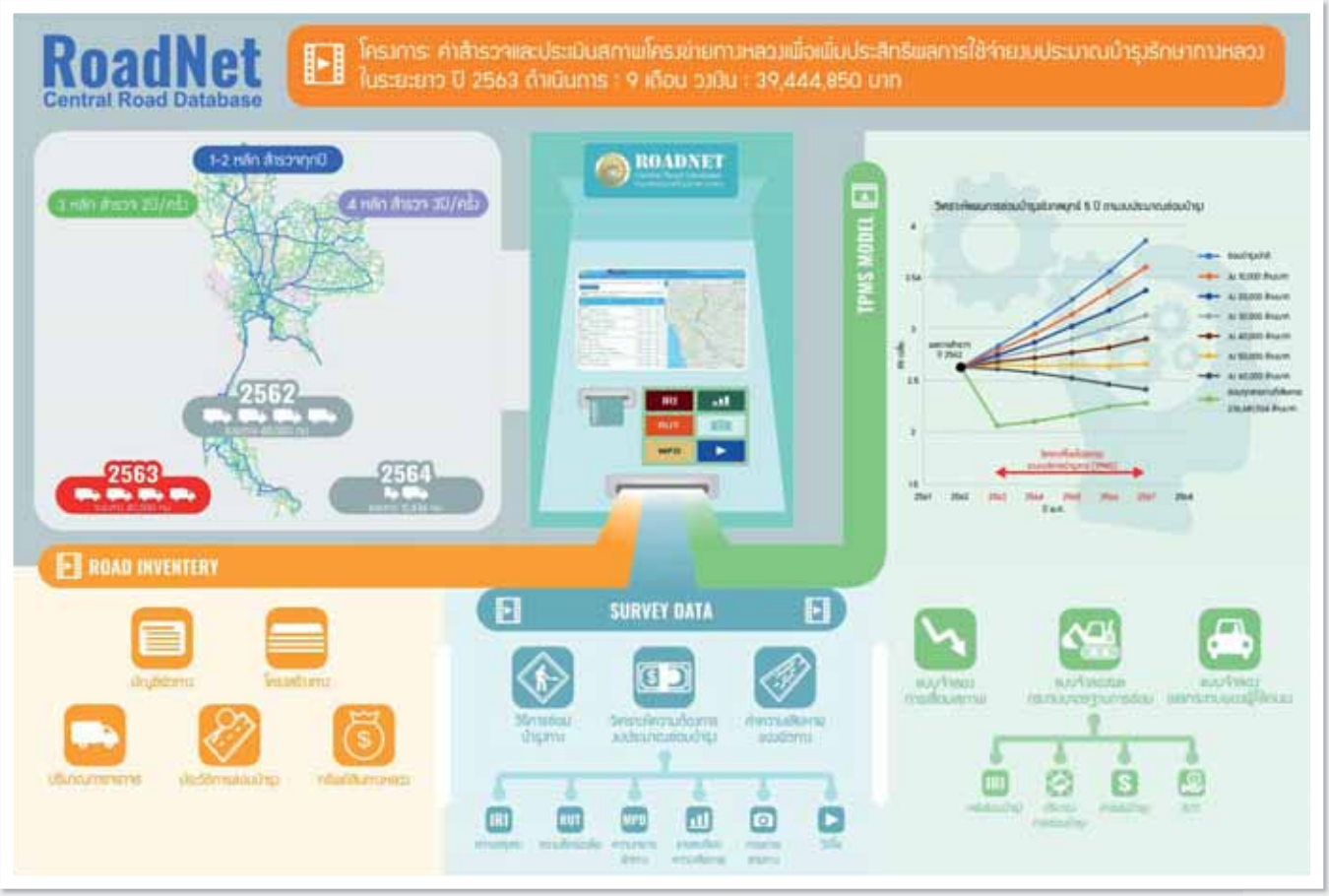
6. Inter Region Maintenance Project

The inter-city road network is the main transport route serving the national economic. Therefore, the Department of Highways has to allocate the budget for maintenance this network in order to keep their capacity in good condition.



7. Survey and Evaluate Highway network Project

The survey and evaluate highway network project is the project that designed for analyzing the maintenance plan by using the survey data such as international roughness index (IRI), rutting, mean profile depth or others damage. The data will be saved in the RoadNet database.



Survey and Evaluate Highway network Project

Arrest Statistics for Overweight Truck Violations on Highways

Office of Traffic Weight Control is responsible for controlling and inspecting vehicles on highways to not carrying goods and being overweight exceed the legal limit. This is to prevent damages to highways, to help keeping highways in good condition, to reduce budget of highways maintenance, and to make sure that highways users can get more convenience, speedy and safety travels on highways.

Report of Operation of Traffic Weight Control in the Fiscal Year 2020

1. Arrest Statistics for Overweight Truck Violations on Highways

The Office of Traffic Weight Control has arrested overloaded trucks at all Weigh Control Stations and has monitored law violators by Mobile Weigh Check Units, Spot Check. In the fiscal year 2020, the total number of records on enforcement against overweight trucks from 1 October 2019 to 30 September 2020 or in 12 months was 2,796. 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 42 cars. Over 4 years from 1 October 2016 - 30 September 2020, the total number of records on enforcement against overweight trucks has been reported 17,583 in total.



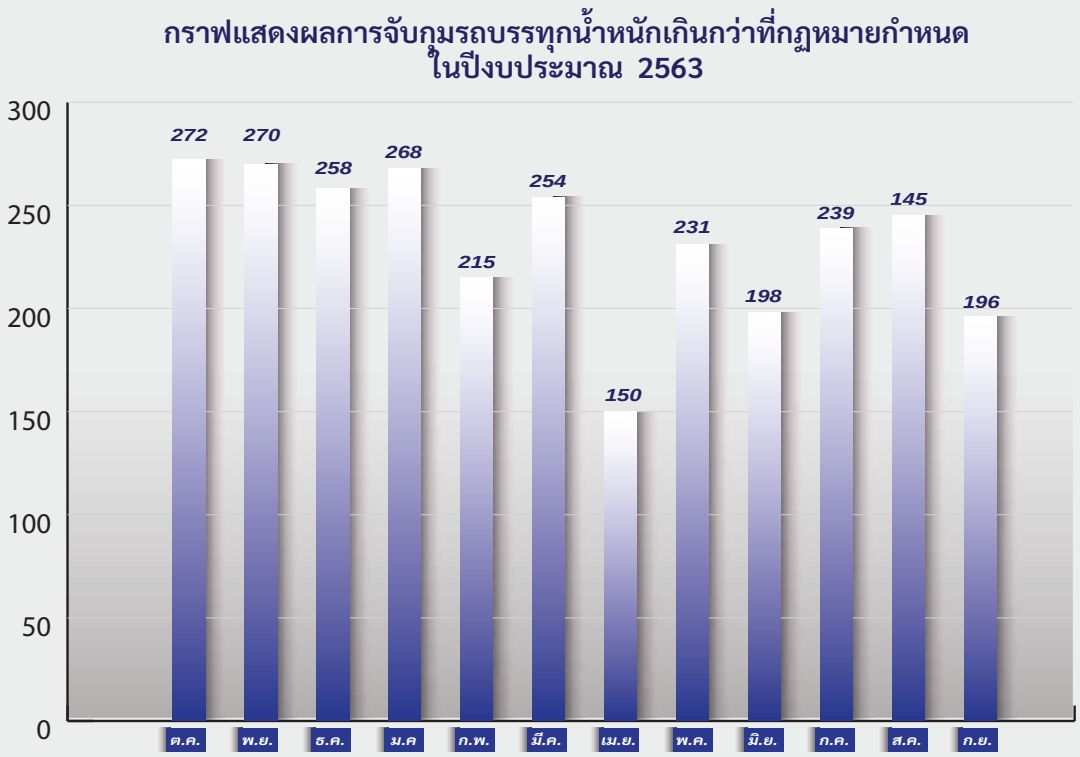


Figure 1: The total number of monthly records on enforcement against overweight of fiscal year 2020

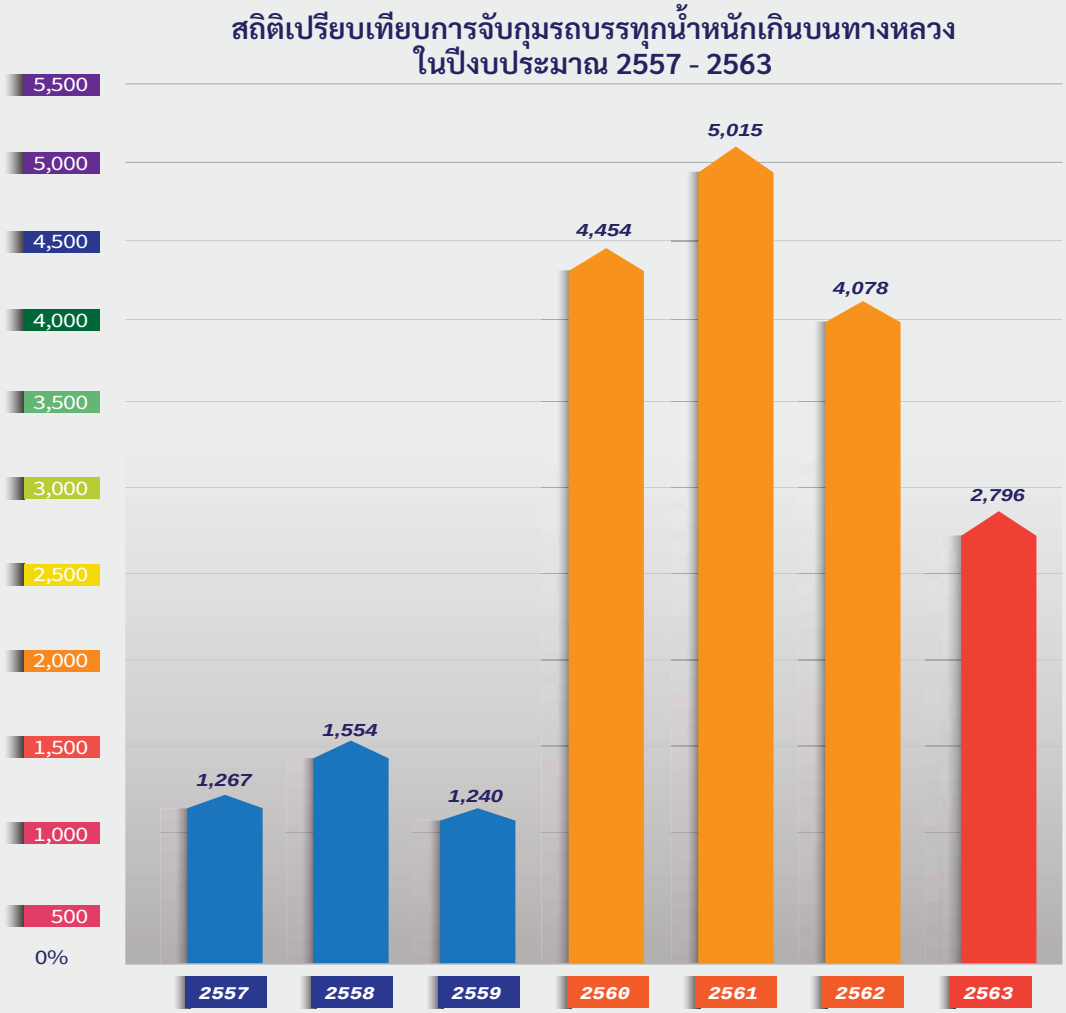


Figure 2: The total number of records on enforcement against overweight from fiscal year 2014 to 2020

The most overweight trucks found are Stones, Soils Sands at 33% and Agricultural products at 20 %

The total number of records on enforcement against overweight from 1 October 2019 - 30 September 2020

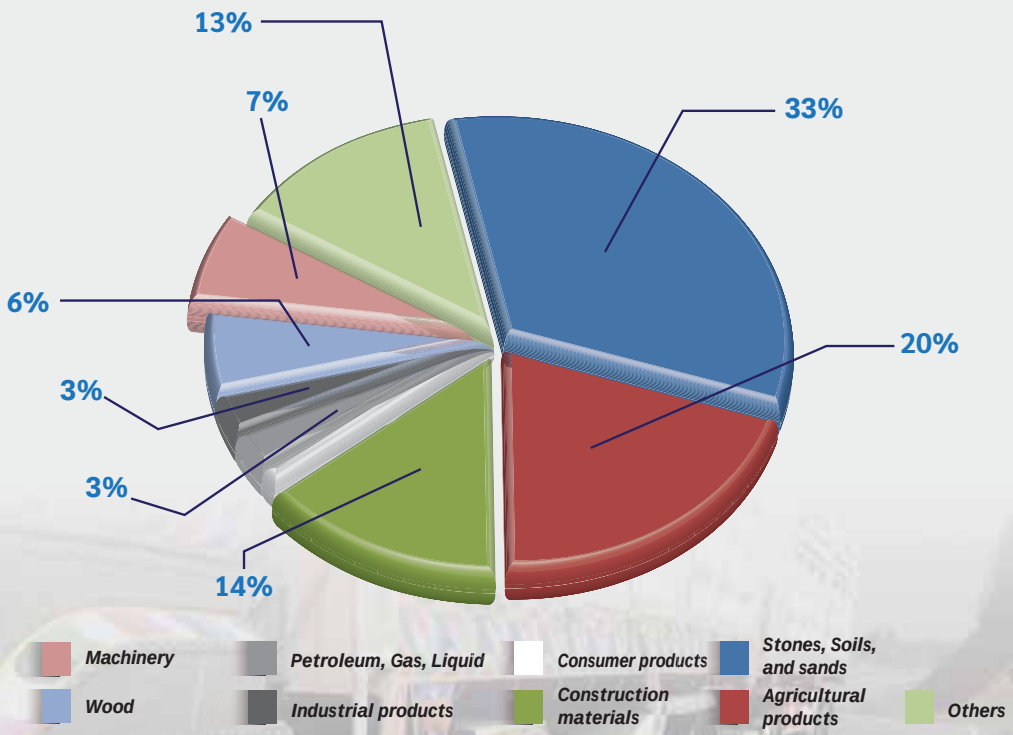


Figure 3: Types of materials carried by the overweight trucks

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.

Licensing 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 2019 to 30 September 2020 was 213 in total.

At present, the software system has been updated for entrepreneurs to apply for permission online (the system is valid as of June 2020) and this is according to the Thailand Government 4.0 policy.

The table below shows the number of records on the license of permission from year 2015 to 2020

Fiscal Year	Number of Route(s)
2558	12
2559	17
2560	82
2561	118
2562	138
2563 (1 October 2019 - 30 September 2020)	213

3. Record of Complaint from Call Center

The Office of Traffic Weight Control sets up the Call Center at 1586 and press external line at 5. The Call Center can quickly solve reported problems within 24 hours. During last year, people were able to appeal overloading trucks on highways and provide useful information to the Office. As a result, the Office of Traffic Weight Control has sent officers to the inspection area to fix problems and record fixed information to improve the operation efficiency and effectiveness. The results of complaints were filed from 1 October 2019 to 30 September 2020, with 673 complaints and the officers has been arranged to investigate the said complaints and arrested 213 trucks.

Month and Year	Number of Complaint(s)	Number of Arrested Car(s)
October 2019	67	35
November 2019	66	30
December 2019	50	22
January 2020	53	52
February 2020	60	21
March 2020	66	12
April 2020	22	0
May 2020	38	0
June 2020	68	11
July 2020	69	15
August 2020	67	13
September 2020	47	2
Total	673	213



4. Progress Report of Weigh Station Construction and Truck Rest 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:

Truck Rest Area

No.	Truck Rest Area	Status
1	Truck Rest Area at Non Soong (Arrival)	Open to public in 2017
2	Truck Rest Area at Non Soong (Departure)	Open to public in 2018
3	Truck Rest Area at Kaeng Khoi (Arrival)	Open to public in 2019
4	Truck Rest Area at Wang Nam Khiao (Arrival)	Open to public in April 2020
5	Truck Rest Area at Sikhio (Arrival)	Open to public in March 2020
6	Truck Rest Area at Prakhon Chai (Departure)	Open to public in March 2020
7	Truck Rest Area at Nam Phong (Departure)	Open to public in April 2020
8	Truck Rest Area at Surin	Expected to complete in November 2020
9	Truck Rest Area and Weigh Station maintenance project at Nakhon Sawan	Expected to complete in November 2020
10	Truck Rest Area and Weigh Station maintenance project at Udon Thani	Expected to complete in March 2021
11	Truck Rest Area and Weigh Station at Phetchabun	Expected to complete in March 2021
12	Truck Rest Area and Weigh Station at Highway No. 201, A.Wang Saphung, Loei Province	Expected to complete in March 2022
13	Truck Rest Area and Weigh Station maintenance project at Maha Sarakham	Expected to complete in July 2022
14	Truck Rest Area and Weigh Station at Ubon Ratchathani	Expected to complete in July 2022

No.	Truck Rest Area	Status
15	Truck Rest Area and Weigh Station at Prachinburi	Expected to complete in July 2022
16	Truck Rest Area and Weigh Station at Mukdahan	Expected to complete in April 2022
17	Truck Rest Area and Weigh Station at Kamphaeng Phet (Departure)	Expected to complete in August 2022
18	Truck Rest Area and Weigh Station at Kamphaeng Phet (Arrival)	Expected to complete in August 2022
19	Truck Rest Area and Weigh Station at Si Saket	Expected to complete in July 2022
20	Truck Rest Area and Weigh Station at Phang-Nga	Expected to complete in October 2022



5. The Project to Improve and Enhance the Capacity of the Central Control Center of the Office of Traffic Weight Control

The Department of Highways by the Office of Traffic Weight Control conducted a study of the project to improve and enhance the capacity of the central control center as expected to be the center for weight control of trucks in ASEAN. According to the policy of the Ministry of Transport, the using of modern intelligent transportation technology will be taken to control and monitor the weight of trucks on highways instead of discretion. This will solve long-term problems of managing large databases (Big Data) as well as integrating data from weighing systems and automation systems on highways across the country. The study was completed in May 2019 and the study results to improve the potential of the central control center are as follows:

1. Improve software to be able to process real-time data to track violators and overloaded trucks and to prevent officers from being corrupt.

2. The structure of the data warehouse and the Geographic Information System (GIS) development plan are linked to the database of various departments. The information are gained to support the analysis of the overweight truck problem, time period, route and related information for executive decision-making to plan and send out officers to do spot check more effectively.

3. Set up the maintenance plan of the Central Control Center at 3, 5, and 10 year period as expected to be an effective framework for the future and will be focus on:

- Efficient technology infrastructure
- Development of the potential of technological personnel
- Development of communication systems and disseminating information via the Internet

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.

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

- In 2017, 59 vehicles
- In 2018, 121 vehicles
- In 2019 (lasted updated at 15 August 2019), 74 vehicles

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 are 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 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



The wildlife corridor on Highway No.304 section Kabinburi district - Pakthongchai district ,Nakhon Ratchasima Province

The Department of Highways puts emphasis on environmental safeguarding and promoting sustainable highway development. Thus our operational framework and direction are set in accordance with the Environmental Quality Enhancement and Protection Act B.E. 2535 and the Office of the Prime Minister's Office Announcement on Public Consultation, B.E. 2548 along with adhering to the Good Governance Principle for transparent, just, and verifiable conducts. The public is welcome to participate in all steps of highway development and we incorporate the public's input in our decision making process for appropriate and practical developments that address the needs of the public.



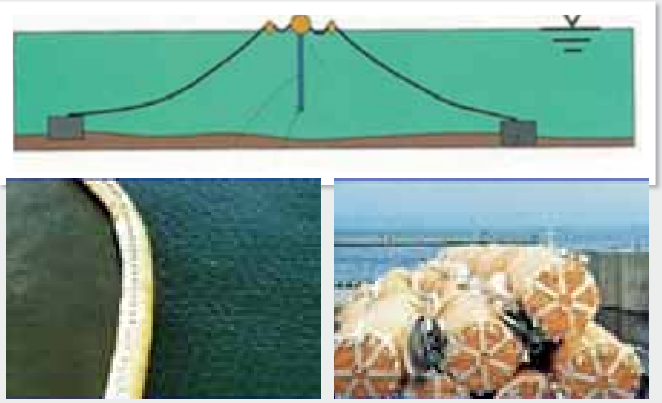
Environmentally friendly highway development

As the Department of Highways strives for environmental protection and minimizing any possible impacts to the environment and society, we conduct environmental impact assessment in order to set up environmental impact mitigation measures for highway projects that pass through conservation areas like national parks and wildlife sanctuary or aligned nearby significant sites, namely, historic sites, world heritage sites, etc. In the last year, the DOH has conducted 15 EIA studies, including:

1) Project detail update report of the EIA for the Intercity Motorway Nakhon Pathom – Cha-am



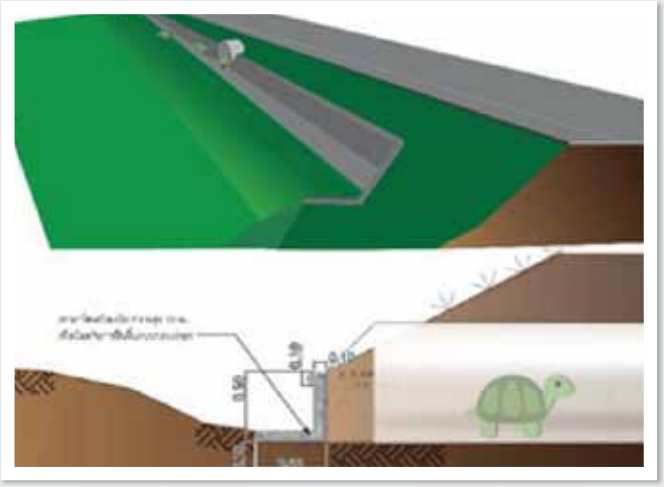
Installation of protecting nets underneath bridge construction to prevent construction debris, i.e. concrete, steel scrap, falling into the river



Prevention of soil erosion, such as, installation of silt curtain to prevent dispersion of riverbed sediments during the bridge construction over Mae Klong River



Installation of metal sheet noise-reflective wall effectively mitigate construction noise at sensitive sites. For the operation phase, in case of traffic noise exceeding the environmental standard, clear noise barrier panels, such as plexiglass or acrylic, will be installed



Designing of reptilian underpass with safety of animals in mind, the design includes a curb that prevents the animals from climbing up to the road but allows them to pass via the underpass under the road

2) EIA for the Amnat Charoen bypass (west side)

3) EIA for the Highway No. 304 Chachoengsao – Tambon Khao Hin Son section Tambon Mueng Kao – Amphoe Phanom Sarakham (km. 100+000-km. 105+500)



Noise mitigation measure by temporary noise barriers (clear acrylic type) in areas with a community by the roadside



nstallation of protecting nets and temporary silt fence to prevent debris and eroded soil from polluting the water resource

4) EIA for Highway No. 333 Amphoe Nong Chang – Utai Thani section Tambon Nong Phai – Utai Thani



Designing for pedestrian underpass using 1 cell box culvert with a width of 2.10 meters at Nong Pluang Temple area station km. 157+663; motorcyclists and bicyclists can also use the underpass



Rest stop areas at 2 locations, on the left at station km. 40+146 and on the right at station km. 44+443 will allow road users to take a break from their journey on the road with both hilly and steep terrain

5) EIA for Highway No. 103 Amphoe Rong Kwang – Amphoe Ngao

6) EIA for Sakon Nakhon bypass (east side)

7) EIA for the tunnel at an intersection of Highway No. 2 and Highway No. 224 (Nakhon Ratchasima junction) Nakhon Ratchasima Province

8) EIA for the railway overpass on Highway No. 3339 (route Huay Chinnasi – Phayamai) Ratchaburi Province

9) EIA for the railway overpass on Highway No. 3470 route Phachai – Tharue (km.14+490) Phra Nakhon Si Ayutthaya Province

10) EIA for the construction of the Khlong Bang Lamoong Bridge on Highway No. 3 km. 132+430 Chonburi Province

11) EIA for Highway No. 4006 Ratchakrood – Lang Suan, Ranong Province

12) EIA for the intersections on Highway No. 311 at junction San Lak Muang to junction Kraison Ratchasi (including the Chao Phraya River bridge) Sing Buri Province

13) EIA for Highway No. 3702 section Bang Khwai – Khao Din (Bang Pakong River bridge)

14) Initial environmental examination (IEE) for the construction and widening of Highway No. 1421 route Hua Doi – Ban Mai Phattana

15) IEE for the highway connecting Chiang Rai – the Mekong River bridge at Chiang Khong section Chiang Rai – Amphoe Khun Tan

Continuous monitoring and improving highway development

To comply with the Environmental Quality Enhancement and Protection Act (No.2) B.E. 2561 clause 51/5 that stipulates submission of the report on implementation of the measures from the EIA report and clause 101/2 that sets the penalty for failure to submit the mentioned report, DOH has carried out 20 monitoring projects, namely:

1) Monitoring of the construction of an elevated road on Highway No. 35 route Thonburi – Pak Tho (Rama 2 Road), Bangkok



Traffic management on Highway No. 35 during the construction providing 6 lanes in the main road and 4-6 lanes in the frontage road thus no lane reduction compared to prior to the project. For construction of elevated road, concrete barriers are installed for clear distinction between the construction zone and road surface along with signs, and lights to warn road users

2) Monitoring for the Intercity Motorway Bang Pa-in – Nakhon Ratchsima (Phase 3)



Due to rock blasting activity during construction because the prevalence of hard rock, so measurement of noise and vibration was conducted at station km..78+500 (Construction section 20)

3) Monitoring of construction of the Intercity Motorway Bang Yai – Kanchanaburi (phase 2)



Noise barrier installation at station km. 54+900 to km.55+300 LT (Construction section 14) to mitigate noise impacts to the nearby communities

4) Monitoring of 4 lane widening construction of Highway No. 304 section Amphoe Kabinburi – Amphoe Pak Thongchai (phase 3)

5) Monitoring of the construction of wildlife corridors on Highway No. 304 (phase 3)



Tracking of wild animals from NCAPs cameras installed around the elevated road. Observed species include deer, pig-tailed macaque, wild pigs in herd, and Asian palm civet.

6) Monitoring of Highway No. 12 route Phitsanulok – Lom Sak, Phitsanulok province (operation phase)



Pre-project



During project

Mitigating soil erosion issue using the Modula Block method to restore damaged soil erosion prevention structures.

7) Monitoring of Highway No.4 route Chumpon – Ranong

8) Monitoring of Highway No. 211 Amphoe Tha Bo – Amphoe Si Chiang Mai, Nong Khai province

9) Monitoring of the extension of elevated highway parallel to Borommaratchachonnani Road and efficiency improvement for Highway No. 338 route Pinklao – Nakhon Chaisi

10) Monitoring of intersection of Highway No. 4 and Highway No. 3087 (Khao Ngoo junction) Ratchaburi Province

11) Monitoring of railway overpass at Highway No. 226 station km. 62+886 (connecting with Surin Highway District area) – junction to Uthumphon Phisai at station km. 75+971, Sisaket Province

12) Monitoring of Nakhon Ratchasima ring road section Highway No. 205 junction – Highway No. 226 junction, Nakhon Ratchasima Province

13) Monitoring of Highway No. 118 route Chiang Mai – Chiang Rai section Amphoe Doi Saket – Baan Mae Chedi (phase 1) Chiang Rai Province

14) Monitoring of the new highway construction route Baan Na Khrai – Amphoe Khamcha-I (phase 2) Kalasin Province

15) Monitoring of the intercity motorway route Chonburi – Pattaya, Chonburi Province (operation phase)

16) Monitoring of Highway No. 12 Section Tak – Mae Sot, Tak Province

17) Monitoring of Highway No. 101 Rong Kwang – Nan Section 2, Nan Province

18) Monitoring of Highway No. 348 Amphoe Pakam – Amphoe Nang Rong, Buriram Province

19) Monitoring of Highway No. 319 Prachinburi – Amphoe Phanom Sarakham section Ban Nong Bua Moo – Amphoe Phanom Sarakham Section 2, Prachinburi Province

20) Monitoring of Highway 3646 Amphoe Aranyapratet – Thailand/Cambodia border (Ban Nong Ian – Satungbot) section of Highway No. 33 junction merged with Highway No. 3586, Sa Khaeo Province

Promoting public participation in highway development

To promote public involvement, The Department of Highways arranges public participation activities throughout the stages of highway development. Especially during the construction stage, public participation meetings were held in compliance with the Office of The Prime Minister's Office Announcement on Public Participation B.E. 2548. Comments and concerns from the people were utilized to improve project implementation to meet the demands of the locals in 324 projects, namely:

1) Highway efficiency improvement 180 projects

2) Highway improvement in community areas: 63 projects

3) New highway projects allocated with B.E.2562 fiscal budget: 81 projects

Mechanical Development according to highway maintenance mission



Bureau of Mechanical Equipment and Communications has studied and developed equipment for highways maintenance mission. Presently, the equipment is the crucial factor in maintenance works, so the bureau has developed equipment in accordance with the users' need which is adapting and developing the exist equipment to be more efficient. This includes the new equipment development, and it can save the equipment rental cost at the same time. As a result, the renter can save more renting cost and be able to access to various kinds of equipment. Consequently, the highway maintenance mission can be more effectively achieved.

The procedure of equipment development is as follows;

1. Collect renters' need from provincial units, collect the equipment development data from provincial units which are shared in KM day and create mechanical plan following the needs.

2. Study mechanical development trend following the need of the renters, design in accordance with mechanical engineering and involved laws as well as control mechanical production.

3. Send developed equipment to the renter and collect feedback in order to better develop the mechanical to be more effective.

Fiscal Year	Mechanical Development
2016	• Prototype of machinery trailer size 5 tons and 10 tons. • 8 Grass cutting farm tractors which installed soil grading blade and hole punch head. • Rubber spray dryer install with 18 trailers size 3-4.5 tons.
2017	• Prototype diesel trailer size 1.5 tons pickup truck • Prototype conveyor belt for trailer of all highway depots. • 20 mechanical truck trailers size 10 tons
2018	• Prototype vibrated grinding machine install on trailer size 3-4.5 tons. • Prototype rubber spray dryer cart. • 7 Trash pouring pickup tray trucks size 1.5 tons
2019	• Prototype grass cutter machine install on hydraulic excavator. • Prototype energy saver recycle asphalt mixer. • 38 diesel pickup tray truck size 1.5 tons
2020	• Prototype radio control soil grinding car. • Prototype 1 ton trailer from the old aluminum roof pickup truck • Prototype trash bucket drainage. • 18 diesel truck size 1.5 tons. • Movable highway maintenance set install on 18 six-wheel trucks size 4 tons. • Trailer set install on 22 six-wheel trucks size 6 tons.



Diesel truck size 1.5 tons with pickup tray





Prototype rubber spray dryer cart.





Movable highway maintenance set install on six-wheel trucks size 4 tons.



Prototype of machinery trailer size 10 tons.

Highway Police Division, Thailand

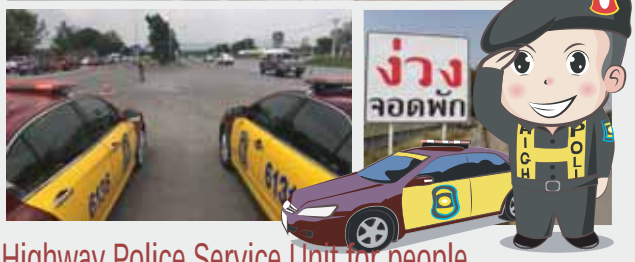
Highway Police Division was established in A.D.1960 (B.E. 2503), which is abreast of people and reliability more than 60 years that is primarily concerned with developing division to support people continually.

The Highway Police Division is committed to the service, facilitate and manage traffic flow on highways and special highways. They also help people travel to destination safely.

In addition, The Highway Police Division is also responsible for crime prevention and suppression. There is an arrest for the offenders against the Department of Highways or offenders under various Acts that use highways in order to make life safety, property prevention, and common benefits of the nation.

Moreover, The Highway Police Division is the leader in building networks of volunteer people. This is to raise awareness to do good for society by conducting all the volunteer workers in development, volunteer workers in disaster, and volunteer for ad-hoc events.





Highway Police Service Unit for people

Nowadays, there are 121 Highway Police Service Units all over Thailand as rest areas for people to stop by on roads. The rest areas are built greatly in standardized construction for people. They provide restrooms, bathrooms, bedrooms and tire's air pressure stations, as well as highway police working 24 hours a day.

There are 41 Highway Police Stations, 201 Highway Police Service Units, with total length of 19,088 kilometers.







Traffic facilitation and Road accident prevention

The Highway Police Division is more concerned with solving traffic congestion problem during festival season, long weekend, including a rush hour. There are a number of measures for solving traffic congestion problem such as open special lanes for management properly in high volumes of vehicles, solve problem in an under construction place, including all traffic problem prevention, which are all aspects as follows;

1.People : We give a training, driving safety tips, and traffic rules and regulations in various channels that people can be accessible. Traffic rules enforce seriously for offenders which effects to all road users to be more safety.



2. Vehicle : We will check vehicles under the condition very often or smuggled trucks, and help the broken vehicles on the road to accident prevention occurs over and over in order to reach the destination safely.



3. Road : We will inspect the road condition to be ready for road users all the time. In addition to, we will arrest excessive truck weight which result in road deterioration, injuries and death.



4. Environment: We make sure that there are no obstacles on the road, such as broken trees across the road, dropped objects, animal debris, including to switch off the light along roadside which will affect the visibility of travelling.

















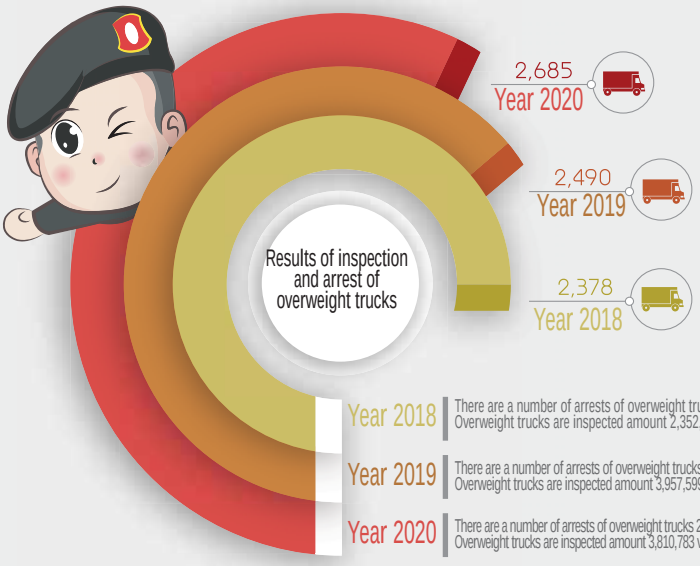


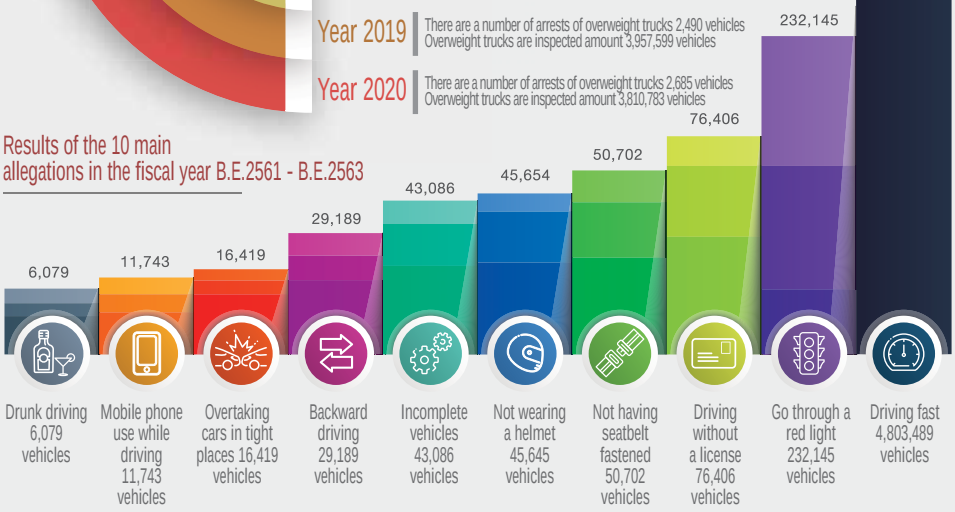




Crime protection and suppression

Offenders who make Department of Highways damaged will be arrested. For instance, invasion of stores on the shoulder of the road which causes of accident, arresting of overweight trucks impact on road infrastructure, arresting of the alleged offender who appear to be stealing electrical wires, traffic signs, equipment, which belong to the Department of Highways. In addition, offenders from Highway Act, such as arresting and blocking drug smuggler or various illegal items, including the major suspects who are dangerous to society. Therefore, result in security and property and lead to common good of nation.





Highway Police as Volunteers

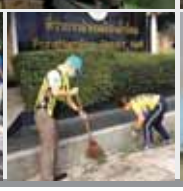
Apart from main responsibility, Highway Police also perform any duty to serve people. Being a Volunteer to help people when are in trouble as the superior's policy. For instances, the flooding in many areas in Nakhon Ratchasima province, the patients were sent to the hospital in time in an emergency cases, broken cars, or even the car ran out of fuel, the highway police were ready to help immediately, etc.













Contact Channel

: Highway Police
: ตำรวจทางหลวง
: ตำรวจทางหลวง

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Legal Work



Developing Highway network is an important mission that the Department of Highways intends to develop a route in order to get more convenient, fast and safe to be the main network of travelling and transportation efficiency. One of the strategic plans of Department of Highway during A.D.2017 - 2021 is to improve the safety level of the highway system integrity. With the continuous development of traffic systems, control systems, and road assessment index, road users are able to travel on modern road safety system. It can also be helpful to improve the quality of life and the economic loss reduction.

To achieve the Department of Highways' safety goal, increasing the safety of the transportation system operation is to develop and increase efficiency of the highway traffic system, which is the important factor to successfully implement strategy. For example, developing and maintenance of traffic signs and markings on the highway system are prepared to provide consistency, uniformity and readiness for "Standard Traffic Signs" throughout the country.

While considering on traffic signs and markings on the highway system currently, the format definition, meaning, characteristics and examples of traffic signs, traffic devices and highway traffic signs are all accordance with the Ministerial Regulation No. 2 (A.D.1981) issued under the Announcement of the Revolutionary Council No. 295 dated 28 November 1972, which is still in effect under Section 75 of the Highway Act, A.D.1992. This is a law that has been enforced for a long time, and is different from the announcement of the Commission for the Management of Land Traffic entitled traffic sign standards, and regulations of the Royal Thai Police entitle Traffic signs, traffic markings and the meaning of them.

Therefore, using the format, meaning, characteristic and example of traffic signs, traffic devices and highway traffic signs would have more modernized and standardized in all over the country, the Bureau of Legal Affairs had prepared a draft Ministerial Regulation on the preparation of traffic signs or traffic markings installation for highway traffic, B.E. .... proposing to the Ministry of Transport in order to propose to the Cabinet for approval as part of the legislation.

The Secretariat of the Cabinet has taken the Ministerial Regulation on the preparation of traffic signs or traffic markings installation for highway traffic, B.E. 2563, published in the Government Gazette, Royal Decree Volume 137, Part 43 kor, dated 17 June 2020, the aforementioned Ministerial Regulation is in effect on all types of highways. This is to develop the level of highway service to the all users so that people can use the Highway system with more safety and convenience

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 2020, 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 Highway Station Program which is broadcasted on the Amarin TV (34 HD), Saradee Song Natee Highway News or a miscellaneous documentary program on PPTV (36 HD) and Spring News (19 HD), also 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.

4 Online Media

DOH has generated its actions through assorted online media which extend to all targets such as Facebook, Twitter, G-NEWS Application, YouTube and Line Official Application.

5 Interview

DOH's senior administrators have been interviewed by many media channel about the important works progress and clarified all facts according to the government's policy through IA-IRChat and Fake News.

6 Multimedia and Exhibitions

DOH has produced publications, graphic works and public relations media 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. Moreover, there is training on Public Relations Network to improve the PR skill and performance.



The Department of Highways digital technology development moving to become the digital organization





According to the Thai National Development Plan "Thailand 4.0". One of the most important system is bureaucratic system. There are 3 successful factors that able to transform the Thailand bureaucrat system to become a "Government 4.0".

1. Collaboration between government and others sectors which are increasing the coordination and cooperation in order to achieve the government goals.

2. Innovation creating for people better life.

3. Digitalization for smart life.

The Department of Highways is a government agency under the Ministry of Transport. The main duty is to develop the infrastructure to complete the national highway network which can link land, water, air, and rail transport. It also helps to drive Thailand in economy, social, culture, technology, and stability through highway network. The Department of Highways sets the Digital Policy to develop and apply the information technology to the activities of the department in order to serve the government policy in driving Thailand into Thailand 4.0.

Digital transformation is important to the development of the Department of Highways in every sections especially service, highway standardization and logistics network aspect. The sections are divided as follows;

Section 1 Development of digital infrastructure

Section 2 Digital reliability

Section 3 Development of digital personnel

Section 4 Using digital technology for develop the Department of Highways

The digital action plan

The Information Technology Center has provided the digital action plan which following the national plan and policy, the Ministry of Transport Digital Development Plan (fiscal year 2017 - 2021) and the Department of Highways Strategic Plan. The vision of the digital action plan is focusing on making the Department of Highways to be a digital organization which driving an innovation creating the convenient and safe highway to serve the people. The digital action plan will emphasize on 3 major targets as follows;

1. "Digitalization" which is managing and serving the data base on the international digital security standard.

2. "Integration" which is linking and changing the data to decrease the duplicate data to make a complete one stop service.

3. "Openness" which is reveal the government data in digital format which consist of 5 strategies as follows;

Strategy 1 : Strengthen the efficiency of digital technology infrastructure

Strategy 2 : Strengthen and develop the information management systems

Strategy 3 : Develop digital innovations for highway engineering

Strategy 4 : Enhance capacity and build standards for digital technology services

Strategy 5 : Empowering human resources in digital technology



Figure 1 : The DOH's digital action plan



The DOH's Enterprise Architecture

The Information Technology Center has established the Enterprise Architecture (EA) by collecting the data from 29 central sectors and 49 local sectors. The enterprise architecture is the integration of information technology and business organization in order to increase the efficiency of the organization to achieve the benchmark. The enterprise architecture consists of 4 major parts which are the Business Architecture, the Data Architecture, the Information System Architecture and the Technological Architecture.

The Business Architecture shows the organization strategy that driving the organization to achieve the goal. The Business Architecture consists of the work flowchart which have 46 work flowchart such as construction work, academic work, managing work etc.

The Data Architecture will express the data structure that come from the Business Architecture which consists of 288 data set. The Data Architecture is the database that provides the information standards in order to be the exchanging data center between the internal and external organizations.

The Information System Architecture shows the organization information systems which have been applied to solve the operation problems and serve the people. The Information System consists of 116 internal systems and 12 external systems.

The Technological Architecture is the major network that link the Department of Highways and other external sectors. The network consists of MOT NET which is the network that link the Ministry of Transport and the Department of Highways and link to DOH NET which is the Department of Highways' internal network and 7 government network centers (GDCC)

The DOH's Enterprise Architecture will show the whole picture of the operation process and the cooperation which not only help to clarify the duplicate spot but also to develop the digital system.

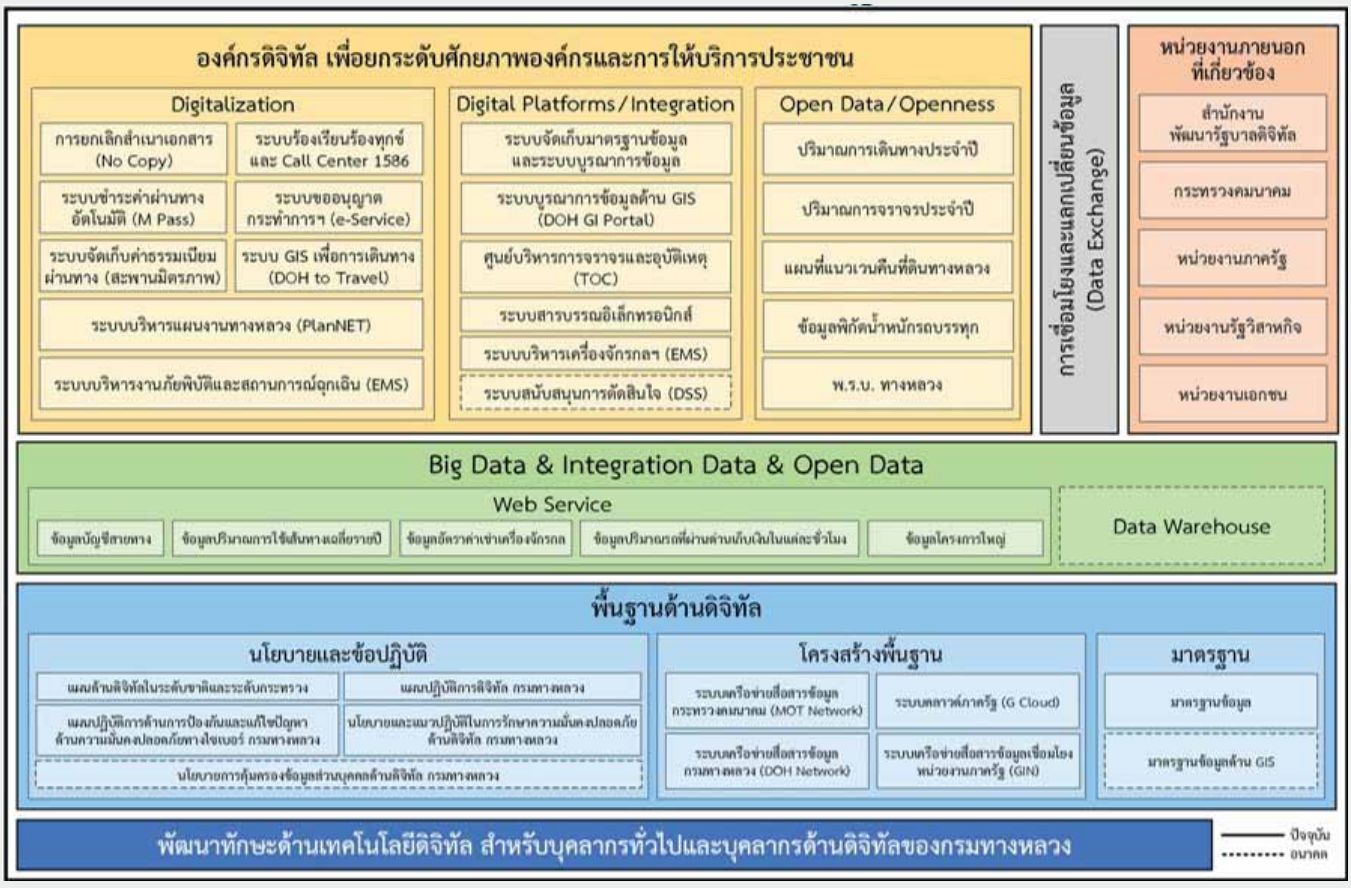


Figure 2: The DOH's digital development following the Enterprise Architecture

Providing the information standards and exchange of government information

The Information Technology Center has provided the information standards in order to be the exchanging data center between the internal and external organizations. Moreover, to response the government policy that needs to increase the government electronic services. The Information Technology Center has developed the website for searching the data such as road network, traffic data, etc. which everyone can search the data on http://sdms.doh.go.th/DOH-SDM-WEBUI/Content_StandardData_I.xhtml.

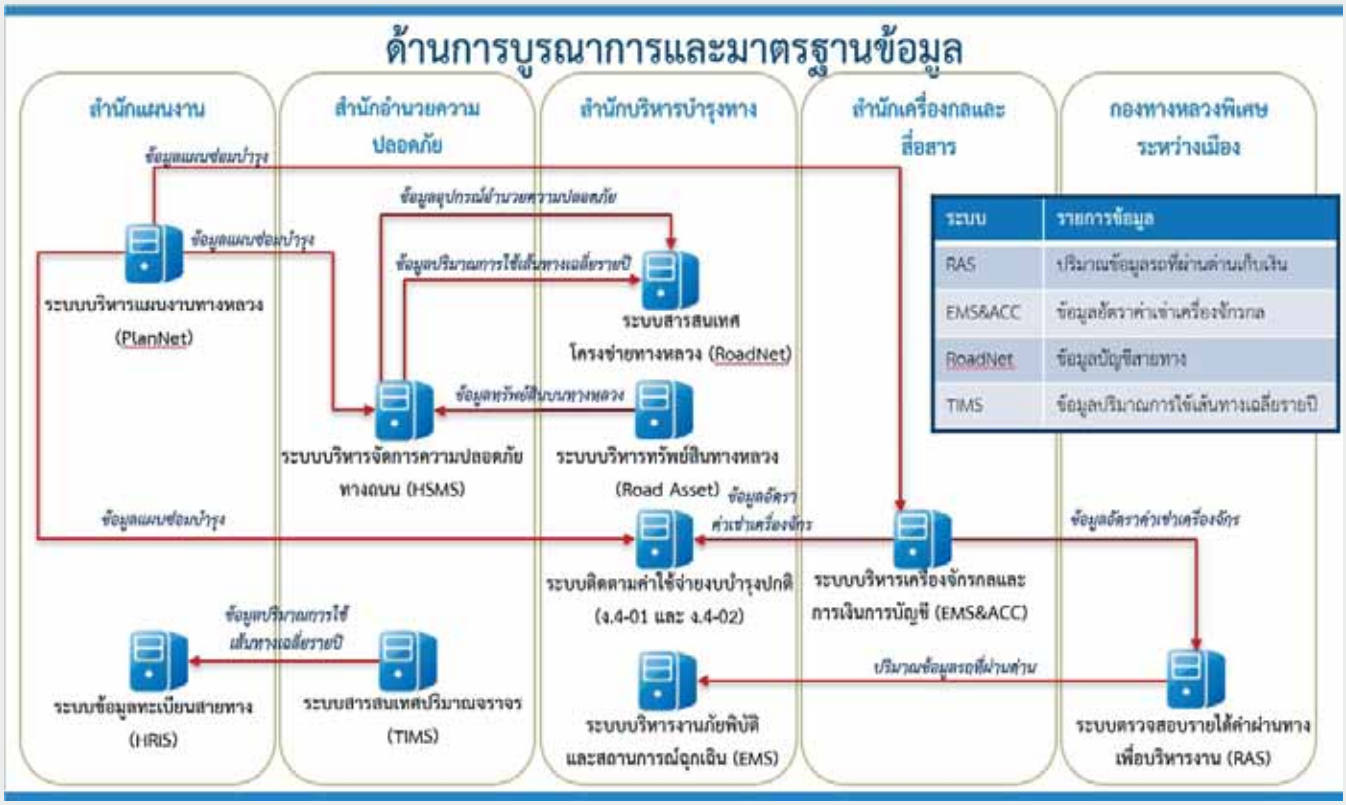


Figure 3: The structure of data standard

The computer systems administration and supply

The Department of Highways set the committee for computer system procurement to consider, diagnose and approve the principle of computer system project which according to the cabinet resolution on 23 March 2004 and the Ministry of Transport's criteria and guidelines for computer system procurement. Moreover, the committee will have to report the status of computer system procurement to the Ministry of Transport as well.

The DOH's personal data protection

According to the digital government policy that lead to the digital development or "Digital Transformations" which creating various communication channels and cause the easier violation of the right of personal information.

The Information Technology Center has established the committee for provide the policy and guideline for protection the DOH's personal information. The policy and guideline will follow the article 6 in the Royal Decree of the rules and procedures for electronic transactions in government sectors B.E.2549 which create the reliable and security in the government electronic transactions.

At present, the Department of Highways has already launched the personal data protection policy and guideline.

Conclusion

Department of Highways has established the DOH's Digital Action Plan to comply with the National Plan and Policies to focus on being a digital organization to drive an innovation creating the convenient and safe highway to serve the people. Moreover, boosting up the cooperation between internal sectors will increase the capacity in digital technology. In order to make the Department of Highways has moved forward in order to achieve the goal "Government 4.0" and "Thailand 4.0"



Photos of Volunteering Activities "Doing good for nation, religion, and the king" on the occasion of **His Majesty the King's Birthday, 28 July 2020.**














จังหวัดกระบี่
จิตอาสาพระราชทาน
ROYAL THAI VOLUNTEERS
เราทำความดีเพื่อ ชาติ ศาสน์ กษัตริย์




DOH











Photos of helping people affected **by COVID-19 pandemic.**








กรมทางหลวงปันน้ำใจ
สู้ภัยโควิด-19
หยิบไปแต่พอดี ถ้ามีร่วนแบ่งปัน


กรมทางหลวงปันน้ำใจ
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