

6 Comprehensive road safety programs on the Rural and/or Local Roads are Implemented in the Pilot Areas (Output 3)

6.1 Outline

Three activities are planned for implementation in the PDM under Output 3, with the effectiveness indicators shown in Table 6.1.1.

Table 6.1.1 Objective Verifiable Indicators

3-1. 3 out of 3 black spots and risk spots on rural roads and/or local roads in the pilot areas are improved.
3-2. The self-rating of local police in the pilot areas conducting enforcement activities exceeds 70% on average.
3-3. Satisfaction rating of local residents on safety programs for vulnerable road users, including children and their parents, as well as agricultural vehicle drivers are carried out in the pilot areas.

6.2 Record of Meetings

DRR was the chair of the regular WG3 meetings. Discussions with external organizations were held to study traffic safety measures by the 3Es. Table 6.2.1 shows the record of meetings with each organization. In the first year, the pilot project for traffic safety measures through the 3Es was conducted in Nakhon Ratchasima Province, Suphan Buri Province in the second year, and Samut Sakhon Province in the third year. The selection of pilot areas was based on understanding the characteristics of accidents in the target provinces using the Accident Report Management System (ARMS) traffic accident database managed by the DRR.

The activities under the 3Es, involving residents and relevant institutions in the pilot areas, required collaboration with the DRR as well as other organizations. In this project, the activities were carried out in cooperation with the RTP, the DDPM, and other organizations.

Table 6.2.1 Record of Meetings (WG3)

Date	Meeting / Organization	Content
2021		
27 January	1 st WG Meeting	• Explanation of activities and schedule for each WG, confirmation of WG chairpersons, next WG date

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25 February	2 nd WG3 Meeting	• Traffic safety measures for DRR, introduction of Japan's traffic safety measures
3 March	Meeting with DRR	• Overview of the project, discussion on selecting pilot prefectures
7 April	3 rd WG3 Meeting	• Method for identifying DRR black spots, selection of pilot area candidates, introduction of Japan's traffic safety education
19 May	4 th WG3 Meeting	• Discussion on future steps, deliberation on pilot area candidates
20 May	Meeting with DLT	• Discussion on traffic safety education
25 May	Meeting with DOH	• Discussion on traffic safety education
1 June	Meeting with RTP	• Discussion on traffic safety education
4 June	Meeting with TSOC	• Discussion on bike lanes
8 June	Meeting with DRR	• Discussion on traffic safety education
9 June	Meeting with TSOC	• Report on field surveys, discussion on bike lanes
11 June	Meeting with RVP	• Overview of RVP • Explanation of insurance company's accident data
25 June	5 th WG3 Meeting	• Selection of pilot areas, future steps, and action plan
1 July	Meeting with TSOC	• Presentation of accident analysis results for pilot areas from TSOC
2 July	6 th WG3 Meeting	• Confirmation of Near-Miss Questionnaire contents
20 July	Meeting with DRR	• Discussion on future activities
11 August	7 th WG3 Meeting	• TSOC's pilot area accident analysis results, enforcement activities, action plan discussion
1 September	Regular Meeting with TSOC WG3	• Accident analysis using GIS
10 September	Regular Meeting with TSOC WG3	• Accident analysis using GIS
21 September	Regular Meeting with TSOC WG3	• Accident analysis using GIS
1 October	Regular Meeting with TSOC WG3	• Review of motorcycle accident analysis in Thailand
18 October	Regular Meeting with TSOC WG3	• Review of accident analysis and countermeasure examples in Suphan Buri (T-intersection accidents)
20 October	Meeting with DRR	• Confirmation of workshop efforts
29 October	Regular Meeting with TSOC WG3	• Review of accident analysis and countermeasure examples in Suphan Buri (speeding-related accidents), definition of Near-Miss
3 November	Meeting with DRR	• Implementation structure of WG3
5 November	Meeting with DRR	• Explanation of software PADMS introduced through local re-contracting
5 November	Meeting with DLT	• Implementation structure of WG3
8 November	Meeting with DRR District Office	• Schedule confirmation for cooperation requests and questionnaire distribution to related municipalities for the 1st year pilot project
8 November	Meeting with Tambon Administrative Organization	• Explanation of the 1st year pilot project and request for cooperation toward workshop
9 November	Meeting with Tessaban Tambon Mu Si	• Explanation of the 1st year pilot project and request for cooperation toward workshop
10 November	Meeting with Moosee Police Station	• Lecture on survey response methods for residents around the target area of the 1st year

		pilot project and request for questionnaire distribution
10 November	Meeting with DLT provincial office	· Explanation of the 1st year pilot project and request for participation in the workshop
15 November	Meeting with DRR district office	· Discussion on schedule for the 1st year 1st workshop
16 November	Meeting with Tessaban Tambon Mu Si	· Discussion on schedule for the 1st year 1st workshop
16 November	Meeting with Moosee Police Station	· Confirmation of the next meeting
15 December	8 th WG3 Meeting	· Report on Near-Miss Questionnaire and drone surveys, confirmation of roles for each institution in the 1st year
17 December	Meeting with Honda	· Collaboration with Honda in WG3
23 December	Meeting with DLT & DRR	· Role of DLT in WG3 activities
2022		
7 January	Meeting with DRR	· Preparation for the first-year pilot project
9 February	Meeting with DRR & DLT	· Report on Near-Miss Survey results for the first year
25 February	9 th WG3 Meeting	· Report on Near-Miss Survey results for the 1st year, preparation for the first-year 1st workshop
28 February	Meeting with DRR District office	· Preparation for the first-year 1 st workshop
9 March	Meeting with DLT	· Review of DLT's traffic safety education and existing materials
14 March	Meeting with TSOC	· Preparation and roles for the first-year 1 st workshop
15 March	Meeting with DRR & TSOC	· Preparation and roles for the first-year 1 st workshop
15 March	Meeting with DLT	· Preparation and roles for the first-year 1 st workshop
17 March	Meeting with Mu Si Police & RTP	· Explanation and roles for the first-year 1 st workshop
17 March	Meeting with DRR District office	· Explanation and roles for the first-year 1 st workshop
18 March	1 st Workshop (First year)	· Conducting of the first-year 1 st workshop
21 March	Meeting with DRR & TSOC	· Review of the first-year 1 st workshop
23 March	Meeting with DLT	· Report on the first-year 1 st workshop
31 March	Meeting with RTP	· Practical training by police, enforcement utilizing volunteers
31 March	10 th WG3 Meeting	· Report on first-year 1 st workshop results, preparation for the 1st year 2nd workshop
6 May	Meeting with DRR	· Conducting audit for pilot areas in Nakhon Ratchasima province
18 May	Meeting with DLT	· Activities of DLT regarding traffic safety education
2 June	Meeting with DRR	· Activities and implementation structure for the second year
6 June	Meeting with DLT	· Activities and implementation structure for the second year
13 June	Meeting with DLT	· Explanation of the second-year activities and budget allocation by DLT
14 June	Meeting with DRR	· Review of the first-year activities, implementation plan, and schedule for the second year
20 June	Meeting with DRR	· Consideration of countermeasures for pilot areas

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		in Nakhon Ratchasima province
22 June	Meeting with RTP	• Inspection and discussion on DUI checkpoints by Bangkok Traffic Police
23 June	Meeting with DRR Suphan Buri Provincial Office	• Explanation of the second-year activities • Discussion, site survey for the second-year pilot area candidates
24 June	Meeting with RTP	• Discussion on strategies for the first-year 2nd workshop and enforcement measures
28 June	Meeting with RTP Bangkok Traffic Department	• Discussion on DUI checkpoints and traffic accident investigation methods in Bangkok
29 June	Meeting with RTP	• Discussion on countermeasures for a pilot project in Nakhon Ratchasima province • Content discussion for first-year 2nd workshop
6 June	Meeting with Highway Police	• Interview and inspection regarding speed violation enforcement
7 July	Meeting with Musi Police	• Presentation of police enforcement activities at the 2nd workshop of the first year
8 July	1 st Workshop (Second year)	• Hosting of the 2nd workshop of the first year
12 July	Meeting with DRR	• Discussion on future initiatives based on the results of the 2nd workshop of the first year
18 August	Meeting with DRR	• Planning activities for the second year and selection of pilot areas
19 August	Meeting with DLT	• DLT's traffic safety education activities in WG3
25 August	Meeting with DRR	• Preparation for the implementation of the first-year pilot project, selection of pilot areas for the second year
6 September	11 th WG3 Meeting	• Discussion on schedule and program for the implementation of the first-year pilot project in Nakhon Ratchasima province • Selection of pilot areas for the second year in Suphan Buri province
12 October	12 th WG3 Meeting	• Discussion on implementation details, schedule, and preparation for the first-year pilot project in Nakhon Ratchasima province • Selection of pilot areas for the second year in Suphan Buri province
25 October	Meeting with DRR, RTP	• Confirmation of schedule for the first-year pilot project in Nakhon Ratchasima province, and activities schedule for the second-year pilot project in Suphan Buri province
2 November	Meeting with TSOC	• Progress report to new TSOC Director, Dr. Chakree, on WG3 activities
4 November	Meeting with RTP	• Cooperation request to Musi Police Station officers regarding WG3 activities
7 November	Meeting with RTP	• Discussion with Mr. Suriyan on training for RTP
8 November	Meeting with RTP	• Courtesy visit to the Deputy Chief of RTP
10 November	Meeting with RTP	• Training on the use of Speed Cameras
11 November	Meeting with Asian Transportation Research Society (ATRANS)	• Online report to an advisor, Dr. Tuenjai, on WG3 activities, discussion on the project website
14 November	Meeting with DLT	• Request for cooperation in next year's WG3 activities, introduction of this year's pilot project activities
29 November	Meeting with RTP	• Report to Accident Reduction Committee Chairperson, Ms. Weerapaht, on training for RTP,

		discussion on future activities with RTP
29 November	Meeting with RTP	· Confirmation of issues with Mr. Suriyan and activities with RTP
1 December	Meeting with DRR	· Evaluation of the first-year pilot project, preparation for the 1 st workshop of the second year
7 December	13 th WG3 Meeting	· Discussion on the second-year activities, preparation for the 1 st workshop of the second year
9 December	Workshop (WG3) for the Second-year Pilot Project	· Identification of dangerous spots and behaviors of traffic accidents by residents in pilot areas
14 December	Meeting with DRR	· Progress of the second-year activities
15 December	Meeting with DRR	· Exchange of opinions on image analysis software being developed by DRR
16 December	Meeting with TSOC	· Schedule and agenda for the 4 th JCC meeting, discussion on WG3 activities
19 December	Meeting with TSOC	· Schedule adjustment for PCG meeting, discussion on WG3 activities
20 December	Meeting with DRR	· Activities in the engineering aspect and implementation details and methods for traffic survey in pilot areas for the second year
23 December	Meeting with RTP	· Discussion with Mr. Suriyan on future activities
2023		
12 January	Meeting with DRR	· Coordination for preparation of 1 st workshop in Samut Sakhon for the second-year pilot project
18 January	Meeting with DRR	· Confirmation of preparation status for 1 st workshop in Samut Sakhon for the second-year pilot project
10 February	Meeting with DRR	· Discussion on traffic volume survey in pilot areas, schedule for pilot project implementation
16 February	Meeting with RTP Headquarters	· Introduction to a new contact, Mr. Yongyuth, and his team members, schedule confirmation for upcoming training
21 February	Meeting with U-thong Police Station	· Confirmation of 9 spots identified in Near-Miss for enforcement, discussion on enforcement situation at U-Thong Police
23 February	Meeting with DRR	· Confirmation of future activity schedule, review of traffic volume survey and discussions with police outcomes
9 March	Meeting with TSOC	· Discussion on traffic safety awareness and PR during the Songkran festival
24 March	Meeting with DRR	· Preparation for Technical Workshop in Suphan Buri province, monitoring methods for WG3 activities
27 March	Meeting with DRR	· Preparation for Technical Workshop in Suphan Buri province, monitoring methods for WG3 activities
30–31 March	Technical Workshop (WG3)	· Technical Workshop in Suphan Buri province
5 April	Meeting with RTP	· Discussion on training scheduled for June
20 April	Meeting with DRR	· Discussion on Engineering measures for the 2nd year pilot project
4 May	Meeting with RTP	· Discussion on RTP training
22 May	Meeting with DRR	· Discussion on countermeasure details
23 May	Meeting with U Thong Police Station	· Confirmation of traffic violation enforcement

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24 May	Meeting with DRR	· Discussion on workshop preparation
25 May	Meeting with DRR Suphan Buri	· Discussion and site inspection for implementation of countermeasures
29 May	Meeting with DRR	· Discussion on monitoring and evaluation methods, implementation structure for community participation approach
31 May	Meeting with DRR Suphan Buri	· Explanation of poster contest for schools
7 June	Meeting with DRR Suphan Buri	· Review of current intersection improvements by DRR
13 June	Meeting with RTP	· Discussion on project progress
13 June	Meeting with TSOC	· Discussion on DRR's CCTV software, possibility of collaboration with RTP
14 June	Meeting with DDPM Suphan Buri	· Discussion on potential future cooperation
15 June	Meeting with Central Police Tactic Training	· Discussion on potential future training implementation
15 June	Meeting with Musi Police	· Meeting with police officials from Nakhon Ratchasima for situation observation
22 June	WG3 Workshop	· Workshop conducted in U-thong
23 June	Traffic Safety Campaign (WG3)	· Campaign conducted in U-thong with RTP, DRR, DOH, DDPM
6 July	14 th WG3 Meeting	· Wrap-up of the 2 nd WS in Suphan Buri, confirmation of evaluation methods for the pilot project
10 July	Meeting with DRR	· Continuation of activities from the first year, software for project effectiveness verification
24 August	Meeting with DRR	· Selection of pilot areas for the third year
7 September	Meeting with DRR	· Comprehensive Traffic Safety Program Implementation Manual
11 September	Meeting with DRR	· Comprehensive Traffic Safety Program Implementation Manual
15 September	Meeting with DRR	· Evaluation using DRR's AI system in Suphan Buri
19 September	Meeting with DRR Suphan Buri	· Inspection of traffic safety efforts by DRR, DDPM, and local government, discussion on project cooperation
29 September	Samut Sakhon Stakeholder Meeting (WG3)	· Explanation of activities, exchange of opinions on risk spots
12 October	Meeting with DRR	· Discussion on measures in Samut Sakhon
24 October	Meeting with DRR	· Planning for future steps in Samut Sakhon
30 October	Meeting with DDPM Samut Sakhon (WG3)	· Explanation of pilot project implementation procedure in Samut Sakhon, coordination with relevant agencies
4 December	Meeting with DRR	· Confirmation of WG3 activity progress
2024		
12 January	Meeting with DRR	· Coordination for 1 st workshop in Samut Sakhon preparation
18 January	Meeting with DRR	· Confirmation of preparation status for the 1st workshop in Samut Sakhon
19 January	First workshop on the third-year pilot project of WG3	· Identification of traffic accident risk spots and dangerous behaviors with the participation of residents in pilot areas
13 February	Meeting with DRR	· Results of the first workshop in Samut Sakhon and discussion of proposed measures
13 March	Meeting with DRR	· Discussion on measures in Samut Sakhon

20 March	Meeting with DRR	· Discussion on evaluation methods of the pilot project in Supan Buri
21 March	Meeting with DRR	· Discussion on measures in Samut Sakhon
19 April	Meeting with DRR	· Confirmation of preparation status for the 2 nd workshop and traffic safety campaign in Samut Sakhon
22 April	Samut Sakhon Stakeholder Meeting (WG3)	· Confirmation of preparation status for the 2 nd workshop and traffic safety campaign in Samut Sakhon
25 April	The 2 nd Workshop for the Third-year Pilot Project	· Explanation of measures in pilot areas for stakeholders, including community people and site visit
26 April	Traffic Safety Campaign (WG3)	· Community-based traffic safety campaign activity in Samut Sakhon with RTP, DRR, and others
14 May	Meeting with DRR	· Explanation of the results of the pilot project in Samut Sakhon and request for confirmation of the manual appendix

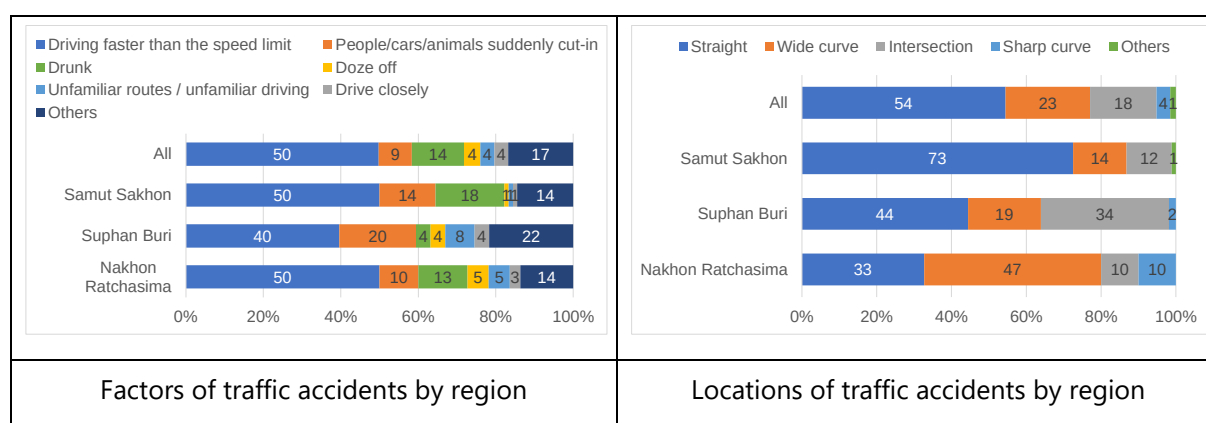
Source: JET

6.3 Activities

6.3.1 Selection of Pilot Areas

(1) Analysis of Traffic Accident Data

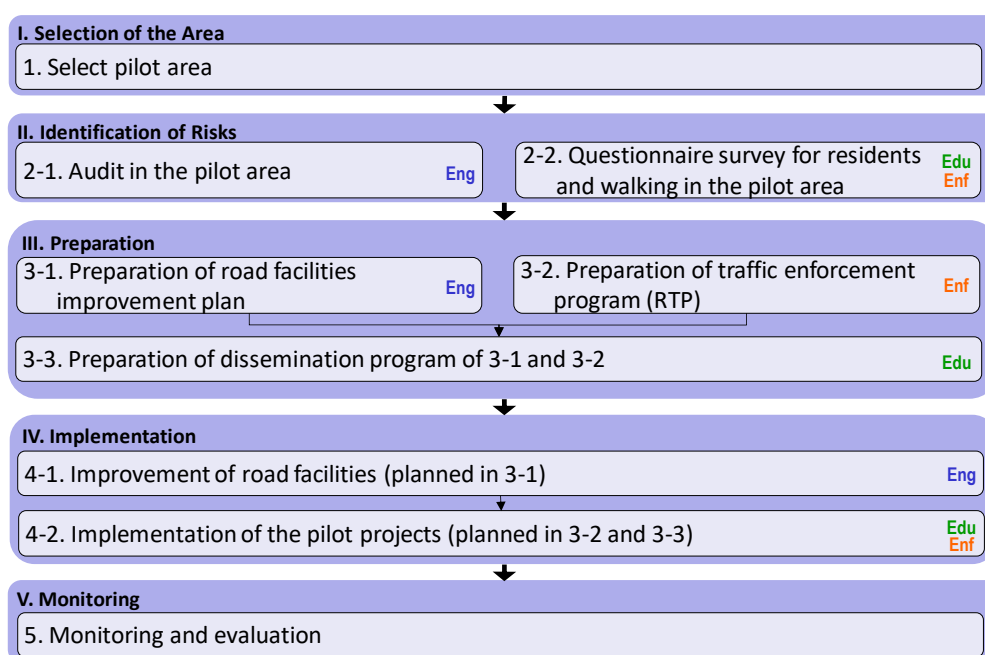
Statistical data on the factors and locations of traffic accidents in Thailand and the three pilot provinces are shown in Figure 6.3.1. The causes of accidents are predominantly due to speeding, which occupies half of the cases, followed by jaywalking and drunk driving. In terms of accident locations, the accidents in Nakhon Ratchasima Province occurred most frequently on mild curves, at intersections in Suphan Buri Province, and on straight roads in Samut Sakhon Province. These locations have been selected for the pilot project in each province.



Source: JET

Figure 6.3.1 Characteristics of Traffic Accidents on Roads under DRR Jurisdiction

After multiple discussions with DRR, it was agreed to proceed with the flow of activities (in Figure 6.3.2) for each pilot project.



Source: JET

Figure 6.3.2 Flow of Activities

(2) The First Year

1) Activity Plan

Table 6.3.1 contains the list of activity items and schedule for the first year. Workshops involving residents were conducted at each project stage as an activity incorporating local participation methods.

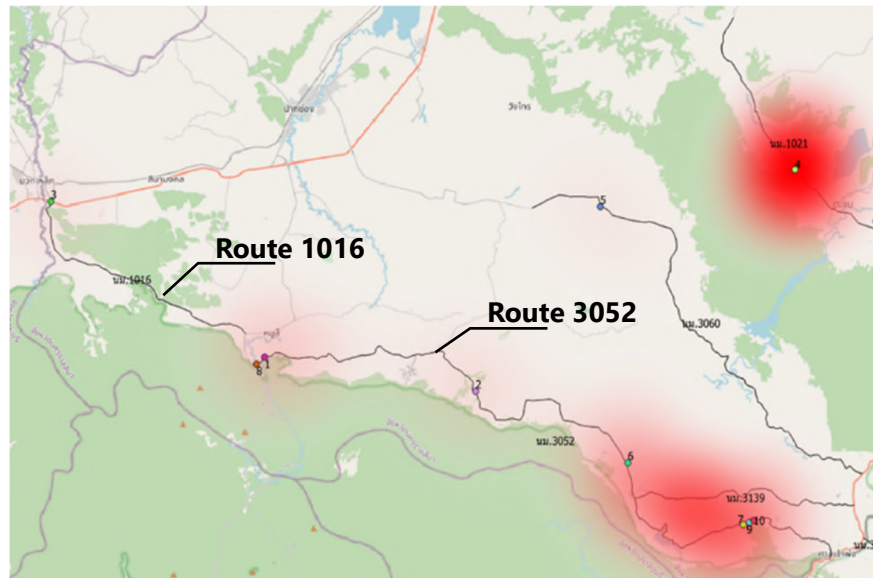
Table 6.3.1 Activity Items and Schedule for the First Year

Activity	Schedule																							
	2021												2022											
	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Participant
Step 1 Select pilot areas																								
1-1 Selection of a target area																								
Step 2 Identify high risk spots and risk behaviors																								
2-1 Identification of risk spots and behavior with residents																								
2-2 Site visit and discussion																								
Step 3 Preparation																								
3-1 Road facilities improvement plan																								
3-2 Traffic enforcement program																								
3-3 Traffic safety education program																								
3-4 Arrangement of the implementation schedule																								
Step 4 Implementation																								
4-1 Road facilities improvement																								
4-2 Strengthen of enforcement and traffic safety education																								
Step 5 Monitoring and evaluation																								
5-1 Monitoring																								
5-2 Evaluation																								
5-3 Feedback																								

Source: JET

2) Selection of target areas for pilot projects

The pilot project area was selected based on DRR's database of traffic accidents and the area with the highest number of accidents. It was confirmed that traffic accidents were particularly frequent on Routes 1016 and 3052.



Source: JET

Figure 6.3.3 Black Spot in Nakhon Ratchasima

For the pilot project selection, there was a site visit on 2 June 2021 on Routes 1016 and 3052 with related agencies (TSOC, DRR, RTP, ATRANS, and Suranaree University of Technology). Figure 6.3.4 shows the outline of the site visit.

Outline of Site Visit : 1016 & 3052 in Nakhon Ratchasima

■ **Date:** 2nd June 2021

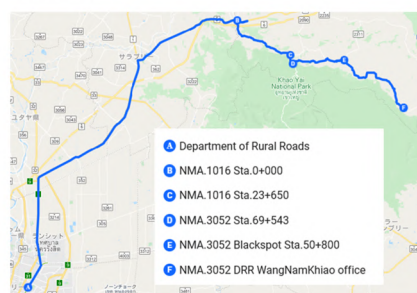
■ **Participants:** 19 people

- TSOC (4)
 - Mr. Sujin Mungnimitr
 - Mr. Sirisak Yimyong
 - Mr. Teerapat Karnkoljak
 - Miss Mayurachat Vichaiikul
- DRR (5)
 - Mr. Santiparp Siriyong
 - Mr. Khajonsak Jernprapai
 - Mr. Pitcha Wachiropathum
 - Mr. Pongsatorn Ngowkarnjananak
 - Mr. Thanachai Intarasorn
- RTP (3)
 - Pol. Capt. Ekkapoom Masorn
 - Pol. Lt. Nuchit Wongtrairatanakul
 - Pol. Sub. Lt. Boonthan Namwongsa
- JICA Expert Team (4)
 - Mr. Ushirooka Hisanari
 - Ms. Inagaki Natsumi
 - Mr. Rittikorn Arunsangsod
 - Dr. Tuenjai Fukuda
- ATRANS (2)
 - Ms. Suwishada Fukuda
 - Ms. Kanjana Saengkham
- Suranaree university of technology (1)
 - Dr. Rattanaporn Kasemsri

■ **Purpose**

- Confirmation of the black spots
- Selection of pilot area based on confirmation of black spots

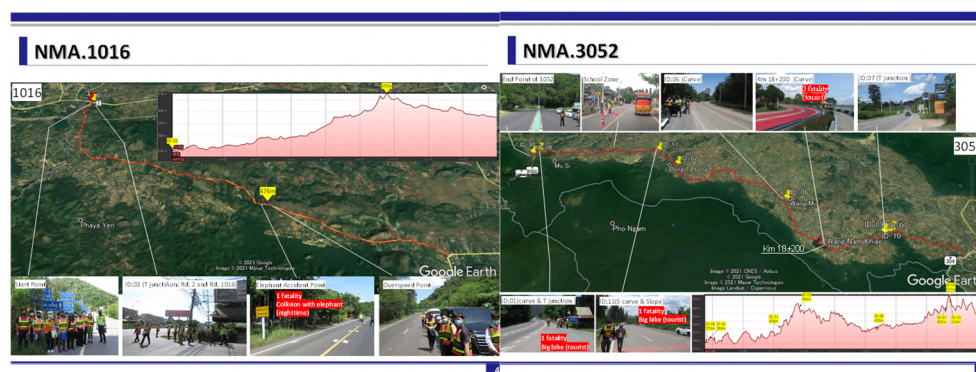
■ **Route**



Source: JET

Figure 6.3.4 Outline of the Site Visit

As shown in Figure 6.3.5, the site visits were on locations identified as accident-black spots (see Figure 6.3.3) and other areas with significant variations in elevation and numerous horizontal curves on the target road.



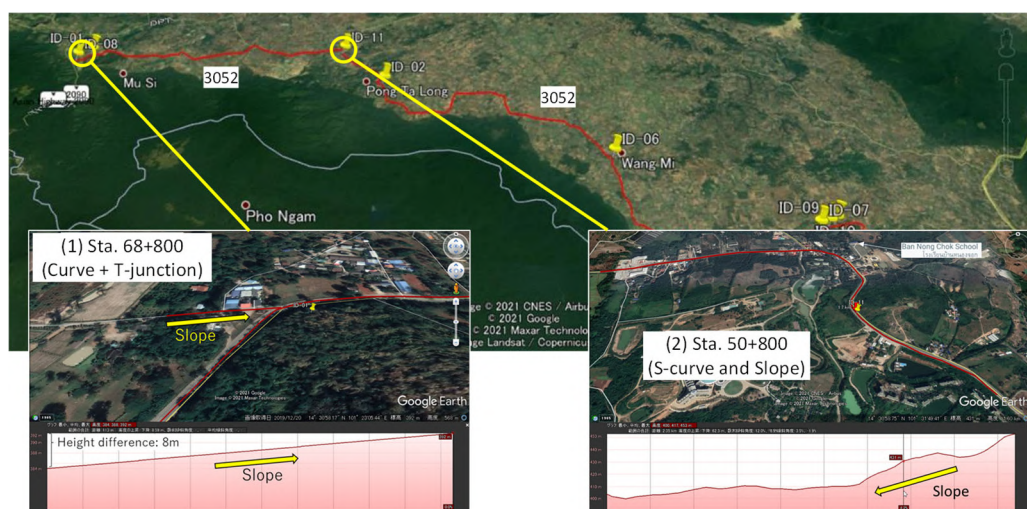
Source: JET

Figure 6.3.5 Summary of the Site Visit

After the site visit, there was a discussion with relevant organizations about the candidate pilot areas for implementing comprehensive traffic safety programs with the participants of communities based on the area characteristics. Two pilot areas, km 68+800 and km 50+800 on Route 3052, were selected at the 5th WG3 meeting, as shown in Figure 6.3.6. However, it was decided to proceed first with the comprehensive road safety program for the community area, including km 68+800, and then repeat the same activities in km

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50+800.



Source: JET

Figure 6.3.6 Location of the Pilot Area

(3) The Second Year

1) Activity Plan

Table 6.3.2 shows the activity items and schedule for the pilot project in the second year. While the pilot project in the first year focused primarily on roads managed by DRR and roads under the jurisdiction of the municipality, the project in the second year focused on a specific area, involving roads under DRR and those under other administrators such as DOH and the municipalities.

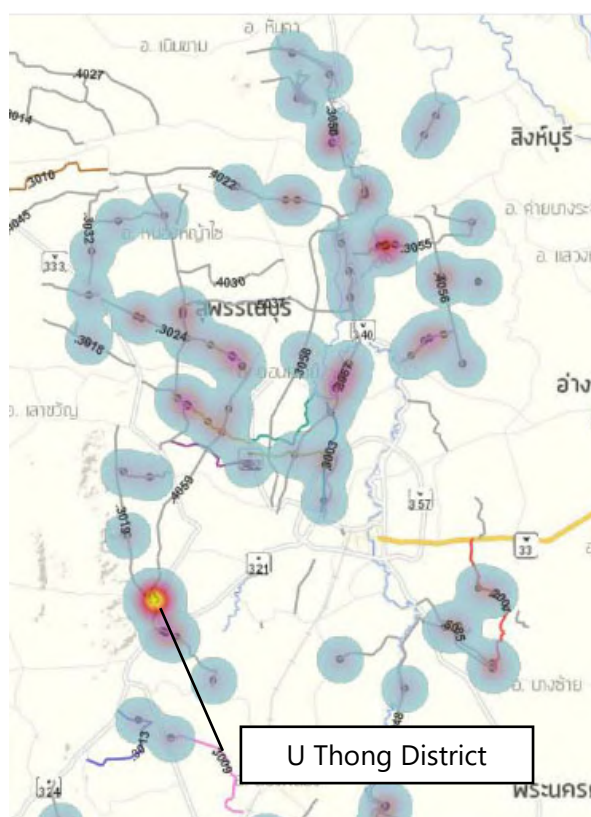
Table 6.3.2 Activity Items and Schedule for the Second Year

Activity	Schedule												Participant			
	2022				2023								DRR DOH	RTP	Local Authority	Residents
	8	9	10	11	1	2	3	4	5	6	7	8	9	10	11	12
Step 1 Select pilot areas																
1-1 Selection of a target area																
Step 2 Identify high risk spots and risk behaviors																
2-1 Identification of risk spots and behavior with residents																
2-2 Site visit and discussion																
Step 3 Preparation																
3-1 Road facilities improvement plan																
3-2 Traffic enforcement program																
3-3 Traffic safety education program																
3-4 Arrangement of the implementation schedule																
Step 4 Implementation																
4-1 Road facilities improvement																
4-2 Strengthen of enforcement and traffic safety education																
Step 5 Monitoring and evaluation																
5-1 Monitoring																
5-2 Evaluation																
5-3 Feedback																

Source: JET

2) Selection of target areas for pilot projects

Based on analyzing the traffic accident data on roads under the jurisdiction of DRR in Suphan Buri, a site survey was conducted to identify areas where accidents frequently occur. Based on the results, selecting the pilot area for the second year was discussed at the 11th and 12th WG3 meetings. DRR proposed the U Thong District, where many traffic accidents occur and many residents live, as the pilot area. The district was selected because it is a central city in the western part of Suphan Buri Province, many of its roads converge, and it is in line with the objectives of the Project.



Source: DRR

Figure 6.3.7 Traffic Accident Heat Map on DRR Roads in Suphan Buri District

(4) The Third Year

1) Activity Plan

Table 6.3.3 shows the activity items and schedule for the pilot project in the third year.

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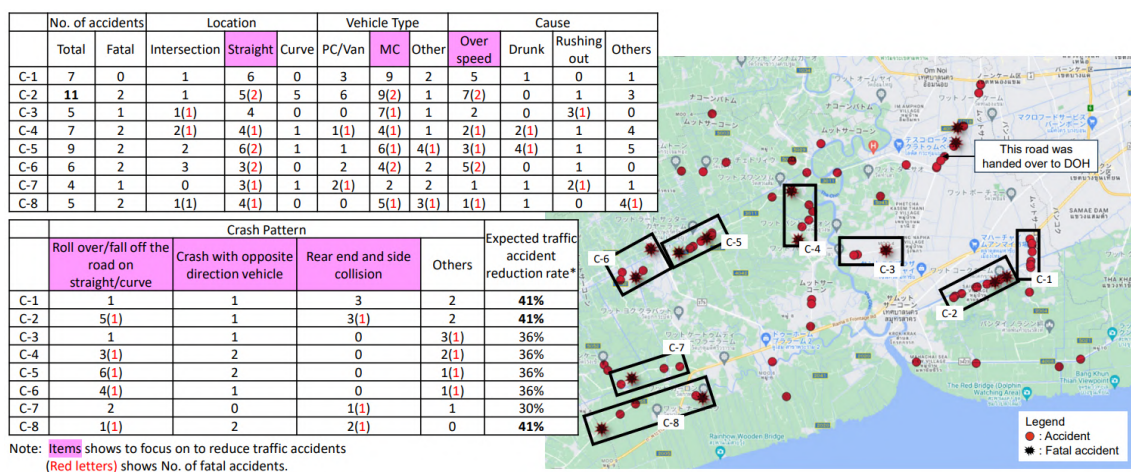
Table 6.3.3 Activity Items and Schedule for the Third Year

Activity	Schedule																							
	2022					2023												2024						
	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	Participant
Step 1 Select pilot areas																								DRR
1-1 Selection of a target area																								RTP
Step 2 Identify high risk spots and risk behaviors																								Local Authority
2-1 Identification of risk spots and behavior with residents																								Residents
2-2 Site visit and discussion																								
Step 3 Preparation																								
3-1 Road facilities improvement plan																								
3-2 Traffic enforcement program																								
3-3 Traffic safety education program																								
3-4 Arrangement of the implementation schedule																								
Step 4 Implementation																								
4-1 Road facilities improvement																								
4-2 Strengthen of enforcement and traffic safety education																								
Step 5 Monitoring and evaluation																								
5-1 Monitoring																								
5-2 Evaluation																								
5-3 Feedback																								

Source: JET

2) Selection of target areas for pilot projects

In the third year, the traffic accident data in Samut Sakhon, which is different from the other two provinces, identified many areas where multiple accidents occur to the same degree, as shown in Figure 6.3.8. Therefore, a cross-tabulation of traffic accidents was conducted to identify the main causes of accidents and accident categories in the province (Figure 6.3.9). The areas with specific traffic accidents were selected (Figure 6.3.8), and from these areas, the number of fatal accidents and the presence of residential areas were compared (Figure 6.3.10). It was agreed with WG3 members that C-2, which includes Route 5031 (under DRR jurisdiction), would be the pilot area.



Source: DRR

Figure 6.3.8 Extracted High Traffic Accident Areas

Table Percentage of traffic accidents in SamutSakhorn (Cross-tabulation of Location, Main Cause and Crash Pattern)

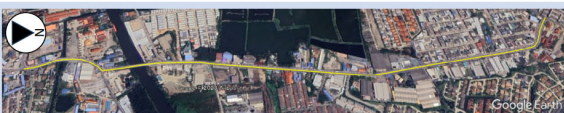
	Straight	Curve	Intersection	U-turn	Total
Over speed	34%	10%	4%	1%	49%
- Roll over/fall off the road on straight	18%	4%	0%	0%	22%
- Crash with opposite direction vehicle	10%	1%	0%	0%	11%
- Rear end and side collision	3%	2%	1%	1%	8%
- Roll over/fall off the road on curve	1%	2%	1%	0%	4%
- Other	2%	0%	2%	0%	4%
Drunk	13%	1%	3%	0%	18%
- Roll over/fall off the road on straight	9%	0%	1%	0%	10%
- Rear end and side collision	2%	1%	0%	0%	3%
- Other	2%	0%	2%	0%	4%
Rushing out	11%	1%	2%	0%	14%
- Crash with opposite direction vehicle	3%	0%	0%	0%	3%
- Rear end and side collision	3%	0%	0%	0%	3%
- Corner crash at intersection	2%	0%	1%	0%	3%
- Other	2%	1%	1%	0%	4%
Overtaking	7%	0%	1%	0%	8%
- Rear end and side collision	5%	0%	0%	0%	5%
- Other	1%	0%	1%	0%	2%
Other	8%	2%	1%	0%	11%
Total	73%	14%	12%	1%	100%

Accidents caused by **overspeed** on **straight/curve** sections accounted for **44%** of the traffic accidents.

Extract crash patterns focusing on **"Roll over/fall off the road on straight/curve", "Crash with opposite direction vehicle" and "Rear end and side collision"**, a crash pattern with a particularly high accident rate. **41%**

Source: DRR

Figure 6.3.9 Cross Tabulation of Traffic Accidents in Samut Sakhon

	No. of fatal accidents		Residential Area
C-1	0	○	
C-2	2	○	
C-8	2	×	

Source: DRR

Figure 6.3.10 Judgment Based on the Fatal Accident and the Existence of Residential Area

6.3.2 Identification of High-Risk Spots and Sections as well as Risk Behaviors on the Rural and/or Local Roads in the Pilot Areas in Cooperation with Local Residents through the Participatory Approach

(1) The First Year

1) Near-miss Questionnaire

From June to July 2021, WG3 members and Prof. Fukuda, advisor to this project, discussed and finalized the content and implementation method of the near-miss questionnaire survey in the pilot area. The questionnaire was divided into a question-and-answer sheet. A map of the pilot area was also attached to the answer sheet to mark the spots where

respondents have had near-miss incidents. The map was designed to be easy for residents to answer by including photos of landmarks. The questionnaire was structured as follows.

- Introduction: Request for survey cooperation, purpose, contact information, and illustrated explanation of near-miss spots.
- Part 1: Basic information about respondents
- Part 2: Road safety knowledge and experience to assess the effectiveness of a comprehensive road safety program
- Part 3: Description of the near-miss experience

The COVID-19 pandemic made it not easy to meet with residents in one place; therefore, the community leaders in the pilot area (Tessaban Tambon Mu Si, Tambon Administrative Organization) were asked to explain the near-miss questionnaire and distribute it to residents. It took more than one and a half hours for the community to understand the questionnaire, showing that its contents must be made easier to comprehend when it will be rolled out to various areas in the future.

On 9 November 2021, 80 copies of the questionnaire were distributed to 8 community leaders in the conference room of the Tambon Administrative Organization. On 10 November 2021, 120 copies were distributed to 18 community leaders in the conference room of the Mu Si Police Station. During the explanation of the questionnaires, Mu Si Police Station participants were also asked to fill it out.

THE PROJECT ON CAPACITY IMPROVEMENT FOR ROAD TRAFFIC SAFETY INSTITUTIONS AND IMPLEMENTATION IN THAILAND

Project Completion Report

Serial No. _____

Questionnaire on Near-miss Experiences

1. Request for Cooperation toward Questionnaire Survey
This questionnaire is a part of the Project on Capacity Improvement for Road Traffic Safety Institutions and Implementation in the Kingdom of Thailand commenced in 2020 as a Technical Assistance Project between Japan International Cooperation Agency (JICA) and Ministry of Transport (MOT) of Thailand.
This project is implementing various road safety activities toward the goal of "The fatalities by road accidents are reduced in Thailand". This questionnaire is a survey to make your area safer. The researcher would be grateful for your assistance to complete the questions below. It will take about 20 minutes to complete this questionnaire. Thank you for your cooperation.

2. The purpose of this Questionnaire Survey
(1) **To understand places where there is a high risk of potential traffic accident occurrence**
To make rural / local roads safer, it is necessary to identify areas at high risk for potential traffic accident occurrence. Therefore, we collect experiences that you feel dangerous while walking, riding a bike/ motorcycle, or driving a car through questionnaire survey.
(2) **To consider countermeasures for traffic safety**
Based on the results gaining from this questionnaire survey, project member (DDR, RTP, TSOC, JICA) will confirm high risk spots and consider traffic safety measures in terms of 3Es (Engineering, Education, and Enforcement) together with representatives from pilot area.
Example of traffic safety measures
➢ To install traffic safety device(s). **(Engineering)**
➢ To create a near-miss map based on the results of this questionnaire survey and conduct traffic safety education activity. **(Education)**
➢ To strengthen enforcement against traffic violations extracted from the results of this questionnaire survey. **(Enforcement)**

3. Inquiry
Thank you for your kindness and cooperation. If you have any questions or require more information, please contact below:
(name), E-mail: (email address).

What is Near-miss Experiences?
Experience people feel danger and/or risk when walking, riding a motorcycle/ bicycle, or driving a car.



Source: JET

Figure 6.3.11 Contents of Near-miss Questionnaire (1/4)

Answer Sheet Serial No. _____

1.7 What method do you use the most when going to the workplace/ school/ or other place? Please fill in the answer below.
STEP1: Select the pattern, STEP2: Select the transportation, STEP3: Enter the number

Existing to: (1) Walk (2) Bicycle (3) Motorcycle (4) Car (5) Pickup truck (6) Public transport (7) Other

1. Home → (1) → Car Parking Area → (4) → Car Parking Area → (1) → Workplace/School/Shopping/Farm

2. Home → Car Parking Area → Drop-off family/children → Car Parking Area → Workplace/School/Shopping/Farm

3. Home → Bus stop → Bus stop → Workplace/School/Shopping/Farm

4. Free answer: Home → Workplace/School/Shopping/Farm

(1) Walk (2) Bicycle (3) Motorcycle (4) Car (5) Pickup truck (6) Public transport (7) Other (specify) _____

Part 2: Your knowledge and experience on traffic safety

2.1 How much do you understand traffic rules? Please select one choice.
☐ (1) Fully understand ☐ (2) Partly understand ☐ (3) Not understand well
☐ (4) Not at all ☐ (5) Never received education about traffic rules

2.2 What traffic rules do you think you follow? Please select all choices that you follow.
☐ (1) Use a cross walk when crossing a road ☐ (2) Follow speed limit
☐ (3) Follow traffic sign and road marking ☐ (4) Not run a red light
☐ (5) Drive with appropriate driving license ☐ (6) Wear a helmet when riding on a motorcycle
☐ (7) Not drive after drinking alcohol

Source: JET

Figure 6.3.12 Contents of Near-miss Questionnaire (2/4)

Answer Sheet Serial No. _____

Part 1: General Information of the Respondent

1.1 Age: _____
 1.2 Gender ☐ (1) Male ☐ (2) Female ☐ (3) Other
 1.3 Occupation
☐ (1) Government Official ☐ (2) State enterprise employee ☐ (3) Private company employee
☐ (4) Business owner ☐ (5) Employee (daily worker) ☐ (6) Teacher/ Professor
☐ (7) Student (Junior high school/ High school/ University) ☐ (8) Not working
☐ (9) Other (please specify) _____

1.4 What type of driving license do you have? (You can answer more than 1 choice)
☐ (1) None ☐ (2) Motorcycle for 1 year ☐ (3) Motorcycle for 5 years
☐ (4) Motorcycle (Permanent) ☐ (5) Car for 1 year ☐ (6) Car for 5 years
☐ (7) Car (Permanent) ☐ (8) Truck
☐ (9) Other (please specify) _____

1.5 What type of vehicle do your household own? Please also answer how often you use the vehicle.

Type of vehicle	Number of vehicle	Frequency of use
☐ (1) None	-	-
☐ (2) Bike		☐ (1) Almost everyday ☐ (2) 3-4 times per week ☐ (3) A few times a week ☐ (4) Once a month ☐ (5) Rarely use
☐ (3) Motorcycle		☐ (1) Almost everyday ☐ (2) 3-4 times per week ☐ (3) A few times a week ☐ (4) Once a month ☐ (5) Rarely use
☐ (4) Car		☐ (1) Almost everyday ☐ (2) 3-4 times per week ☐ (3) A few times a week ☐ (4) Once a month ☐ (5) Rarely use
☐ (5) Pickup truck		☐ (1) Almost everyday ☐ (2) 3-4 times per week ☐ (3) A few times a week ☐ (4) Once a month ☐ (5) Rarely use
☐ (6) Other (please specify)		☐ (1) Almost everyday ☐ (2) 3-4 times per week ☐ (3) A few times a week ☐ (4) Once a month ☐ (5) Rarely use

1.6 What type of vehicle do you mostly use for daily travel?
☐ (1) Walking ☐ (2) Bike ☐ (3) Motorcycle
☐ (4) Private car ☐ (5) Pickup ☐ (6) Taxi
☐ (7) Public transportation (songtaew/ motor-tricycle/ tuktuk)
☐ (8) Other (please specify) _____

Project Completion Report



Source: JET

Figure 6.3.13 Contents of Near-miss Questionnaire (3/4)

Answer Sheet			Serial No. _____	
3.1 Location number	3.2 Your transportation when you encountered the near-miss incident	3.3 The other side's transportation when you encountered the near-miss incident	3.4 What do you think was the cause of near-miss incident?	
Please mark the risk spots on the map above. If you have several experiences that you feel dangerous when walking, riding a motorcycle, or driving a car, please mark all spots and put number for each location.	(1) Walking (2) Bicycle (3) Motorcycle (4) Tricycle (5) Passenger car (6) Taxi (7) Pickup truck (8) Songtaew (9) Van (10) Other _____	(1) Pedestrian (2) Bicycle (3) Motorcycle (4) Tricycle (5) Passenger car (6) Taxi (7) Pick-up truck (8) Songtaew (9) Van (10) Animal (11) Other _____	[Human factor] (1) Drunk driving (2) Drowsy driving (3) Drive in the wrong direction (4) Slowly drive or immediately stop (5) Run a red light (6) Careless driving (7) Not give turning, stopping, or parking sign (8) Over speed (9) Person(s) passing in front of car (10) Change lanes to avoid on-street parking/ animal/ or other obstacle (11) Reckless overtaking (12) Other (_____) [Vehicle factor] (1) Run out of gas (2) Modified vehicle (3) Tire is too old (4) Other (_____) [Road and environmental factor] (1) Slippery road surface (2) Uneven road surface (3) Narrow road (4) Dark due to no light (5) Dark even if there is a light (6) Rain (7) Glare (8) Hide by obstacle (9) Poor visibility due to curve or intersection (10) Poor visibility due to on-street parking (11) Animal passing in front of car (12) No traffic sign even if it is necessary (13) Hard to understand traffic sign (14) Hard to see traffic sign due to obstacle (such as tree) (15) No traffic mirror (16) No sidewalk (17) Other (_____)	
Example of Answer	3	3	9	-
①			[Human factor]	[Vehicle factor]
②			[Human factor]	[Vehicle factor]

3.5 Please draw the situation of your near-miss experience	
- Please draw the situation of your near-miss experience referring to the following example or Appendix. - Please put number to show the positional relationship between you and the other. - Also, please give some information to make understand the environment of the location.	Example You : 1 → Other: 2 - - -> Example You : 1 → Other: 2 - - ->

Source: JET

Figure 6.3.14 Contents of Near-miss Questionnaire (4/4)

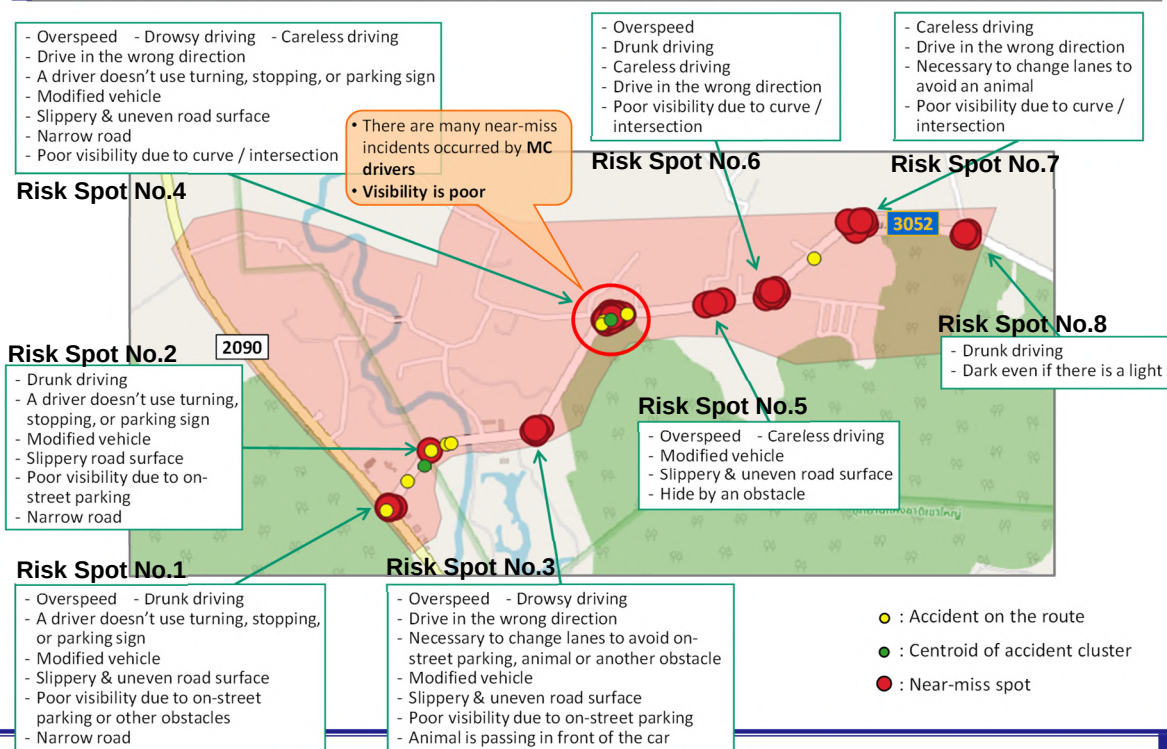


Source: JET

Figure 6.3.15 Explanation of Near-miss Questionnaire

The results of the near-miss questionnaire, as shown in Figure 6.3.16, indicate that near-miss points are concentrated at T-intersections and curve sections.

1.9 Summary of blackspots and near-miss spots at km 60+800



Source: JET

Figure 6.3.16 Risk Spot by Near-miss Questionnaire

Table 6.3.4 Risk Identified from Near-miss Questionnaire

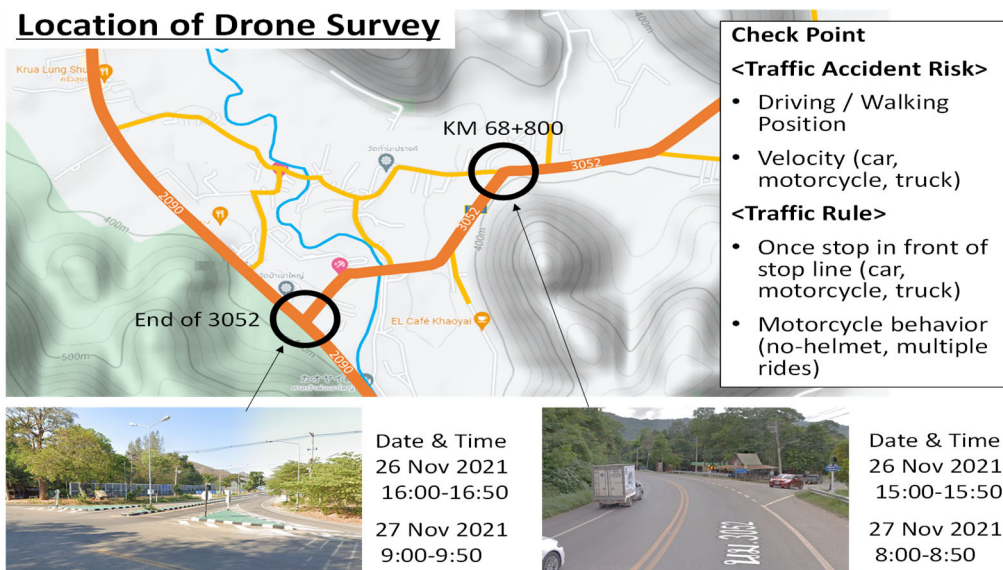
Location	Traffic accident risk identified from Near-miss Questionnaire
Risk Spot 1 (69km+500)	· Drivers tend to drive at high speed · Parking on the side of the road for shopping · Lack of warning sign
Risk Spot 2 (69km+300)	· Visibility is not good, and there are dense trees. Therefore, drivers cannot see a car coming from the opposite direction at the curve section. · Cars entering the campsite slow down, but the cars behind cannot slow down at a short distance. · The campsite entrance is very steep, and the area is rocky. Drivers need to step down the acceleration pedal to climb. · When a driver waits to make a right turn to enter the campsite, cars from the left direction always drive at high speed (drivers do not notice the community road). · There should be legal supervision of parking on the roadside.
Risk Spot 3 (68 km+900)	· Many cars go in and out of nearby restaurants and cafes.
Risk Spot 4 (68km+300)	· Many drivers drive at high speed when entering the curve. · Slope and sharp curve section. · Poor visibility. · There is no traffic warning sign. · Insufficient lighting. · No lane to turn right.
Risk Spot 5 (68km+000)	· The stop line is located far from DRR road. Therefore, a driver exiting the community road cannot see the car driving on the DRR road. · Poor visibility due to dense trees and information board · There is a speed limit sign (30 km/h), but no other sign why speed must be reduced. · Drivers do not follow the sign and slow down the vehicle. · Dense trees cover many traffic signs, so they are easy to miss by drivers. · Overspeed.
Risk Spot 6 (67km+700)	· There is no standby point for drivers who want to turn to the community road. · There is no stop line for cars coming from the local road. · Overspeed.
Risk Spot 7 (67km+300)	· No lighting. · Lack of devices to reduce speed. · Lack of warning signs about sharp curve · All cars drive at high speed.
Risk Spot 8 (66km+800)	· Many motorcycles' taillight is damaged. · Many motorcycle users drive without wearing a helmet.

Source: JET

2) Drone Survey

Checking the traffic situation in the roads of the pilot area revealed that there was little traffic and that the problem was with the roads under DRR jurisdiction in the outer perimeter. Therefore, there were drone surveys on the evening of 26 November and the

morning of 27 November at the curved sections (Risk Spot No.4) and T-intersections (Risk Spot No.1) where most accidents occur.



Source: JET

Figure 6.3.17 Location of Drone Survey (First Year)



Source: JET

Figure 6.3.18 Implementation of Drone Survey (First Year)

Survey Plan for Drone

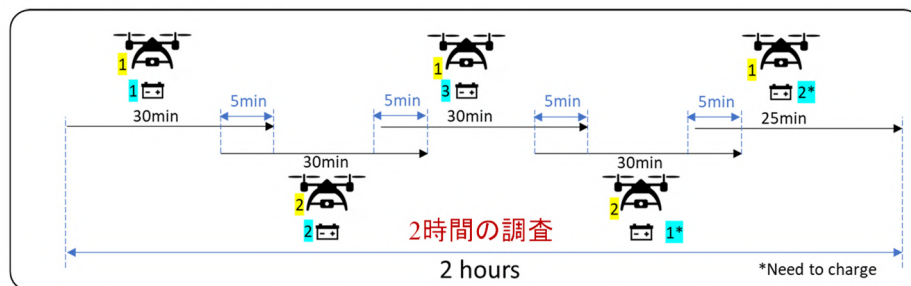
<Precondition>

- Survey time: 2 hours (morning & evening peak hour)
- Available time of Battery : 30 min

<Required number of drone and battery>

- Drone: 2
- Battery : 3

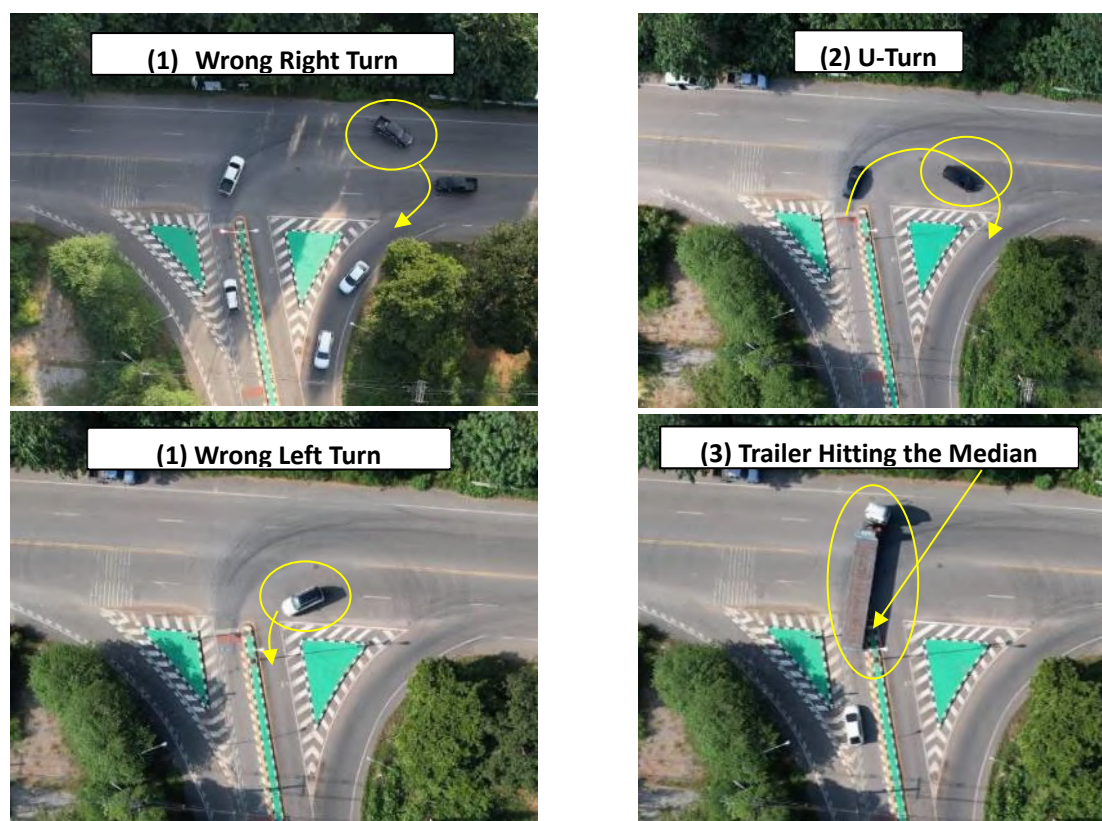
<Drone Survey Plan>



Source: JET

Figure 6.3.19 Summary of Drone Survey (First Year)

Dangerous behaviors obtained by the drone survey were shared with stakeholders. At the T-intersection (Risk Spot No.1), shown in Figure 6.3.20, there were cases where (1) drivers entered the intersection from a lane other than the one they should have used because the road surface markings were difficult to understand, (2) drivers were confused and made a U-turn because the destination sign was difficult to recognize, and (3) a trailer could not make the turn and hit the median.



Source: JET

Figure 6.3.20 Dangerous Behaviors Identified by Drone Survey (First Year)

Table 6.3.5 Dangerous Behaviors Identified from Drone (First Year)

Location	Dangerous behavior identified from drone survey
Risk spot 1 (69km+500)	· Wrong right turn
	· Wrong left turn
	· Trailer hitting the median
Risk spot 4 (68km+300)	· Over speed
	· Ignoring a stop sign
	· Driving the wrong way

Source: JET

In parallel with identifying risk spots, DRR conducted a Road Safety Audit (RSA)¹ in the pilot area to understand the current issues and consider possible countermeasures. An

¹ RSAs by DRR are usually conducted in preparation for the annual budget. The number of locations where RSAs are conducted differs each year, and they are conducted after a major traffic accident occurs. There are three levels of RSA training within DRR: Inspector, Auditor, and Senior Auditor. Nationwide, 600 Inspectors conduct RSAs, and there is at least one Inspector in each local office. The Auditor approves the results of the RSA after it has been conducted. There are 100 Auditors nationwide, with at least one in each Regional Office.

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RSA report was prepared based on the procedures outlined in DRR's RSA and Improvement Manual for Existing Roads and the Road Safety Principal Manual.

3) Targeted Risk Spots and Dangerous Behaviors

Based on the near-miss questionnaire results and the drone survey, it was decided to create a traffic safety program focusing on the following.

- Curve sections: Overspeed.
- T-intersections: Ignoring the stop sign and sudden appearance.

(2) The Second Year

1) Near-miss Questionnaire

A workshop with resident participation was held on 9 December 2022, during which a near-miss survey was conducted, and a near-miss map was created.

In addition, the slightly complicated part of the first year's near-miss questionnaire was changed, as shown in Figure 6.3.21.

Answer Sheet Serial No. _____

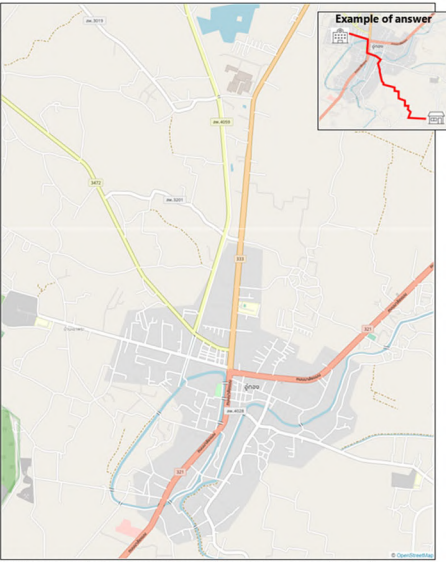
1.7 What method do you use the most when going to the workplace/ school/ or other place? Please fill in the answer below.

STEP1: Select the pattern, STEP2: Select the transportation, STEP3: Enter the number

Example	(1) Walk (2) Bicycle (3) Motorcycle (4) Car (5) Pickup truck (6) Public transport (7) Other	Pattern	Destination
0.	(1)	Home → Car Parking Area → Car Parking Area →	Workplace / School / Shopping / Farm
1.		Home → Car Parking Area → Car Parking Area →	Workplace / School / Shopping / Farm
2.		Home → Car Parking Area → Drop-off family/ children → Car Parking Area →	Workplace / School / Shopping / Farm
3.		Home → Bus stop → Bus stop →	Workplace / School / Shopping / Farm
4.	Free answer		
		Home →	Workplace / School / Shopping / Farm

(1) Walk (2) Bicycle (3) Motorcycle (4) Car (5) Pickup truck (6) Public transport (7) Other (specify) _____

1.7 Plot your workplace (school, shopping, farm) and home locations and connect your travel routes with a line.



1.8 Your transportation when commuting to workplace (or school, shopping, farm).

□ (1) Walking □ (2) Bike □ (3) Motorcycle

□ (4) Private car □ (5) Pickup □ (6) Taxi

□ (7) Public transportation (songtaew/ motor-tricycle/ tuktuk)

□ (8) Other (please specify) _____

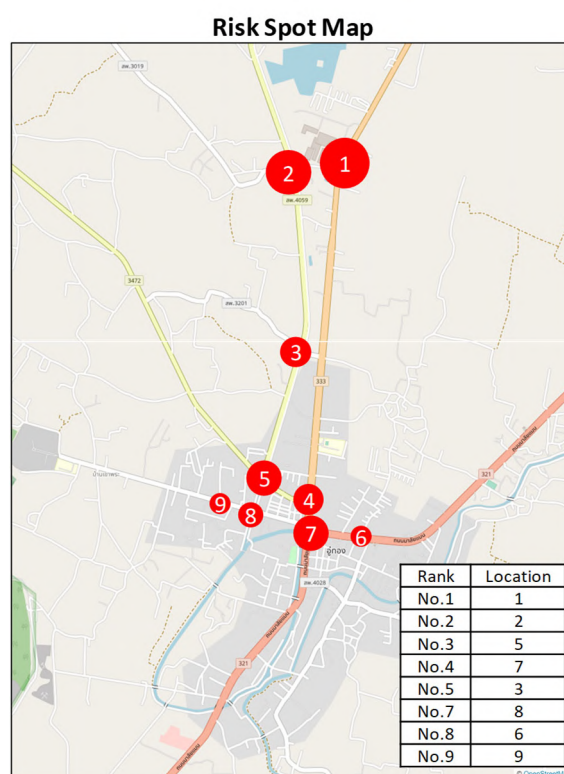
Source: JET

Figure 6.3.21 Change to Near-miss Questionnaire



Source: JET

Figure 6.3.22 Conducting Near-miss Questionnaire and Creating Near-miss Map



Source: JET

Figure 6.3.23 Identified Risk Spots

Table 6.3.6 Activity Items and Schedule for the Second Year

Location	Traffic accident risk identified from Near-miss Questionnaire
Risk Spot 1	- Main human factors are careless driving and not giving way when turning. - Main road factors are the uneven surface, the narrow road, and poor visibility.

Project Completion Report

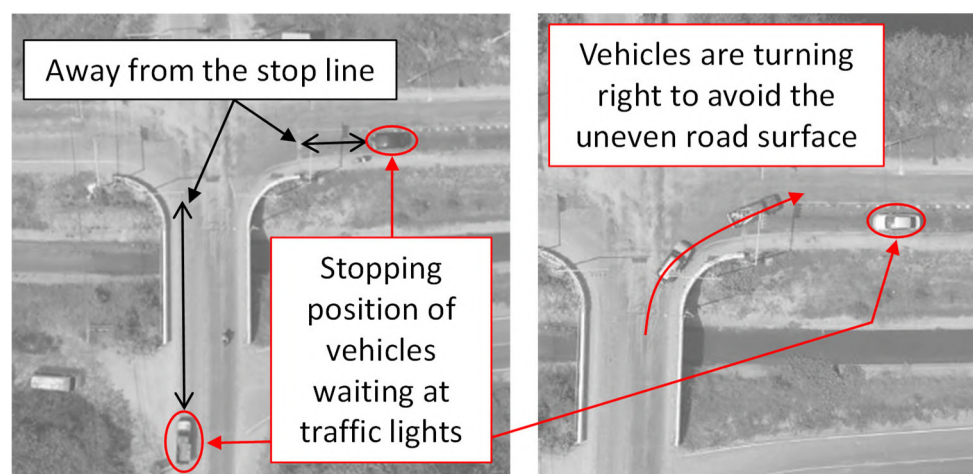
	Type of situations are intersection collision of vehicles from crossing the road.
Risk Spot 2	- Main human factors are careless driving, not giving way when turning, and slow driving. - Main road factors are the narrow road and uneven road surface. - Type of situations are intersection collision of vehicles from other roads.
Risk Spot 3	- Main human factors are careless driving, not giving way when turning, and changing lanes. - Main road factors are the narrow road and darkness during the night. - Type of situation is intersection collision of vehicles from other roads and vehicles in the same direction.
Risk Spot 4	- Main human factors are not giving way when turning, careless driving, and changing lanes. - Main road factors are poor visibility and uneven road surface. - Type of situation is intersection collision of vehicles from other roads.
Risk Spot 5	- Main human factors are careless driving and not giving way when turning. - Main road factors are the uneven road surface, narrow road, and poor visibility. - Type of situation is the intersection collision of vehicles from crossing the road.
Risk Spot 6	- Main human factors are changing lanes and slow driving. - Main road factor is the narrow road. - Type of situation is the U-turn vehicles.
Risk Spot 7	- Main human factors are careless driving and not giving way when turning. - Main road factors are no traffic signs and the narrow road. - Type of situation is the intersection collision of vehicles from crossing the road.
Risk Spot 8	- Main human factors are careless driving and not giving way when turning. - Main road factor is the narrow road. - Type of situation is the intersection collision of vehicles from other roads and animals.
Risk Spot 9	- Main human factors are careless driving and changing lanes. - Main road factors are the narrow road and poor visibility. - Type of situation is the intersection collision of vehicles from other roads.

Source: JET

2) Drone Survey

All risk spots had drone surveys, and the videos were analyzed to identify risky behaviors. An example of an analysis of the risk spot no. 2 is shown in Figure 6.3.24. Many vehicles stopped further away from the stop line at signalized intersections. This is attributed to vehicles that prevent obstructing large vehicles when they turn right or left because of the narrow intersection. Also, the damaged pavement at the intersection was due to large

vehicle traffic. Some vehicles were seen taking shortcuts when turning right to avoid the damage.



Source: JET

Figure 6.3.24 Examples of Dangerous Behavior Obtained from Drone Survey

Table 6.3.7 Dangerous Behaviors Identified Through Drone Survey

Location	Dangerous behavior identified from drone surveys
Risk Spot 1	· Conflict between vehicles turning right / left and vehicles going straight.
Risk Spot 2	· Large vehicles passing through the stop line when turning right / left. · Vehicles turn right to avoid the uneven road surface.
Risk Spot 3	· Left-turning vehicles use the opposite lane (main road to bridge).
Risk Spot 4	· Conflict between vehicles turning right / left and vehicles going straight. · Large vehicles use two lanes to make left turns.
Risk Spot 5	· Vehicles stopped at the intersection obstruct the right turn for large vehicles (because there is no stop line).
Risk Spot 6	· Conflict between vehicles turning left from a narrow street and U-turn vehicles from the opposite lane.
Risk Spot 7	· Conflict between vehicles following the lane and vehicles taking a shortcut. · Large vehicles unable to turn in the left-turn lane. · Conflict between large vehicles turning left and vehicles going straight.
Risk Spot 8	· Difficult to find a driving position due to lack of lane markings.
Risk Spot 9	· Overspeed.

Source: JET

Project Completion Report

3) Targeted Risk Spots and Dangerous Behaviors

Based on the results of the near-miss questionnaire and the drone survey, it was decided to create a traffic safety program focusing on the following.

Intersections: Collision with oncoming vehicle and careless driving.

(3) The Third Year

1) Near-miss Questionnaire

A workshop with resident participation was held on 19 January 2024, during which a near-miss survey was conducted and a near-miss map was created.



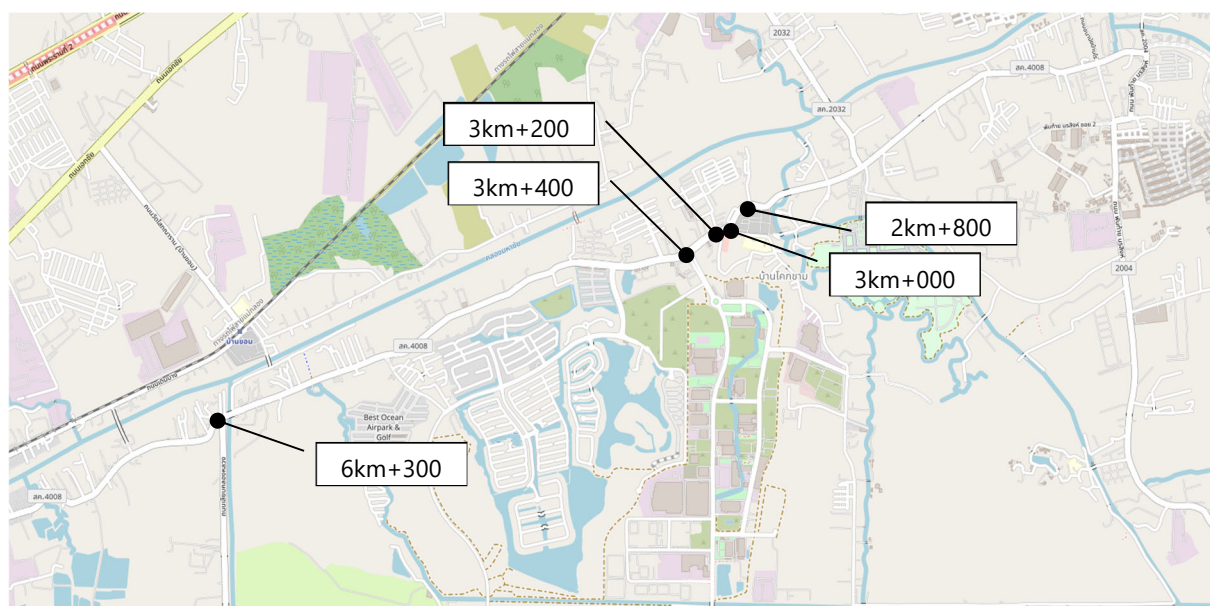
Source: JET

Figure 6.3.25 Creating Near-miss Map (Third Year)



Source: JET

Figure 6.3.26 Near-miss Map (Third Year)



Source: JET

Figure 6.3.27 Identified Risk Spots (Third Year)

Table 6.3.8 Dangerous behaviors identified through Near-miss Questionnaire (Third Year)

Location	Dangerous behavior identified through Near-miss Questionnaire
2 km+800	· Main human factors are overspeed, careless driving, and reckless overtaking. · Main road factors are poor visibility and darkness. · Type of situation is the intersection collision of vehicles crossing the road.
3 km+000	· Main human factors are overspeed and careless driving. · Main road factors are poor visibility caused by obstructions. · Type of situation is the intersection collision of vehicles crossing the road.
3 km+200	· Main human factors are overspeed and careless driving. · Main road factors are poor visibility caused by obstruct. · Type of situation is the intersection collision of vehicles crossing the road.
3 km+400	· Main human factors are overspeed and reckless overtaking. · Main road factors are poor visibility caused by obstacles and darkness. · Types of situations are intersection collisions of vehicles from the entrance of the village and collisions between crossing pedestrians and vehicles.
6 km+300	· Main human factors are not giving way when turning, careless driving, changing lanes to avoid cars parked on-street, and people passing in front of cars. · Main road factors are poor visibility caused by obstacles and no traffic signs, hidden obstructions, and darkness. · Type of situation is the intersection collision of vehicles crossing the road.

Source: JET

Project Completion Report

2) Drone Survey

The pilot area had a drone survey that helped identify the risk spots in a workshop with the community participation to confirm the current status and identify issues.



Source: JET

Figure 6.3.28 Dangerous Behaviors Identified by Drone Survey (Third Year)

Table 6.3.9 Dangerous Behaviors Identified through Drone Surveys (Third Year)

Location	Dangerous behavior identified from drone surveys
3km+000	· Suddenly changing lanes to avoid parked vehicles on-street.
3km+200	· Conflict between right and left turning vehicles when entering the industrial park.
3km+400	· Suddenly changing lanes to avoid parked vehicles on-street. · Vehicles don't stop when there are pedestrians in the crosswalk.
4km+500-600	· Overspeed
6km+300	· Difficult to find and stay in a driving position due to lack of lane markings.

Source: JET

3) Targeted Risk Spots and Dangerous Behaviors

Based on the results of the near-miss questionnaire and the drone survey, it was decided to create a traffic safety program focusing on the following.

Straight section: Overspeed, lane changing, or turning

6.3.3 Preparation of Comprehensive Road Safety Program in the Pilot Areas

(1) The First Year

1) Road Facilities Improvement Plan

The policies as countermeasures against dangerous behaviors of “overspeed on curve sections, ignore the stop sign, and sudden appearance at T-intersection” identified from the Near-miss Questionnaire and drone surveys were determined as follows:

- Setting speed limits corresponding to the road geometry.
- Relocating stop lines to appropriate positions.
- Installing traffic signs and road markings in accordance with traffic rules.

Based on these policies, measures were summarized as shown in Table 6.3.10.

Table 6.3.10 A List of Engineering Countermeasures for the First Year

Location	Limited speed	Stop line	Color pavement	Traffic Cone	Pavement Markings
Risk Spot 1 (69 km+500)	50 km/h	–	Zebra and color pavement (red)	–	–
Risk Spot 2 (69 km+300)	50 km/h	–	Zebra and color pavement (red)	–	–
Risk Spot 3 (68 km+900)	50 km/h	Relocation	Zebra and color pavement (red)	–	Intersection marking
Risk Spot 4 (68 km+300)	50 km/h	Relocation	Zebra and color pavement (red)	Installation of traffic cone	Intersection marking
Risk Spot 5 (68 km+000)	50 km/h	Relocation	–	–	Intersection marking
Risk Spot 6 (67 km+700)	50 km/h	Relocation	–	–	Intersection marking
Risk Spot 7 (67 km+300)	50 km/h	–	Zebra (red)	–	–
Risk Spot 8 (66 km+800)	50 km/h	Relocation	–	–	Intersection marking

Source: JET

2) Traffic Enforcement Program

A) Training

From November 21 to 23, a three-day training course on traffic enforcement and accident investigation (Activities 1-3) was conducted mainly for RTP traffic police officers in charge of the pilot area. Lectures were given on the first day, and the second and third days were spent at the Central Tactical Training Center, RTP's training facility in Nong Sarai, for hands-on training in enforcement activities and accident investigation. The program is listed in Table 6.3.11.

Project Completion Report

Although it was planned that the same police officers would participate on all three days, RTP requested for as many police officers as possible to attend and understand the activities and results of this project, and due to the rotation of police officers' daily duties, only a few police officers participated on the entire three-day training.

Table 6.3.11 Enforcement Training Program of the First Year

Date	Contents	Participant
Day 1 November 21 10:30~15:30	• Lectures ➢ Enforcement Activities in Japan ➢ Accident Investigation in Japan	• 3 police officers, RTP Headquarters • 1 instructor, Second Regional Police Academy, • 1 instructor, Third Regional Police Academy, • 30 police officers, 6 pilot area police stations • 2 officials, TSOC
Day 2 November 22 9:00~15:00	• Practical Training of Enforcement ➢ Ignoring Stop Signs	• 3 police officers, RTP Headquarters • 1 instructor, Second Regional Police Academy, • 1 instructor, Third Regional Police Academy, • 10 police officers, 2 pilot area police stations • (3 of them attended the lecture on the 21st) • 3 officials, TSOC
Day 3 November 23 9:00~15:00	• Practical Training of Enforcement ➢ Over speeding • Practical Training of Accident Investigation ➢ Investigation of accident scene: Crash at Intersection	• 3 police officers, RTP Headquarters • 1 instructor, Second Regional Police Academy, • 1 instructor, Third Regional Police Academy • 10 police officers, 2 pilot area police stations (2 of them attended the lecture on the 21st) • 3 officials, TSOC

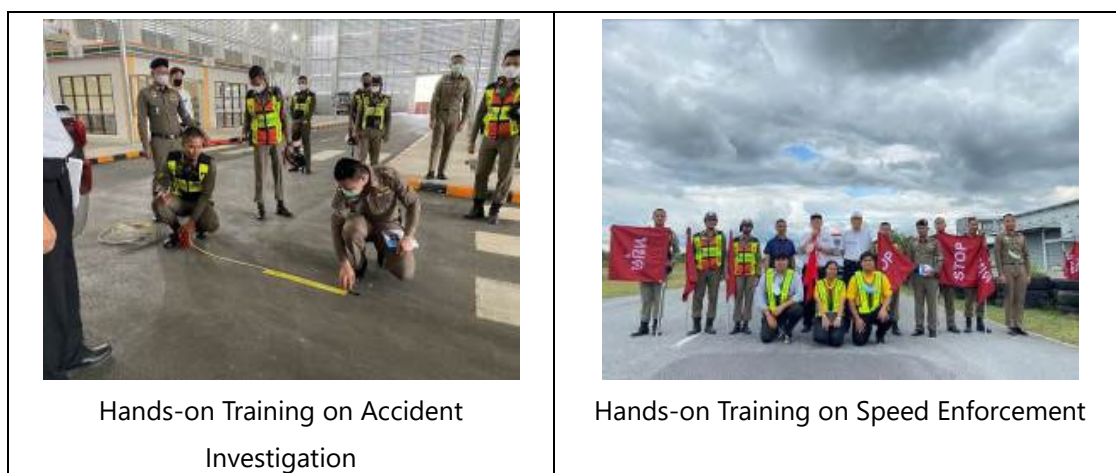
Source: JET



Lecture by JICA expert



Hands-on Training on Stop Line Enforcement



Source: JET

Figure 6.3.29 First Year of Enforcement Training

3) Traffic Safety Education Program

A) Poster Contest

On 8 November 2022, the DRR conducted a meeting at Ban Prang Khla School and Ban Mu Si School, which were selected for the Poster Competition, to explain the outline of the competition and request the creation of traffic safety posters for the schools.



Source: JET

Figure 6.3.30 Prior Explanation for Poster Competition (First Year)

B) Traffic Safety Campaign

Flyers and posters for distribution to drivers, as well as banners and placards for participants to hold, were prepared (Figure 6.3.31 and Figure 6.3.32) for the traffic safety campaign.

Project Completion Report

The messages for the traffic safety campaign, which would increase traffic safety awareness among Thai people, were determined through discussions with the DRR and TSOC. The flyers and banners included messages, such as "Drive Slowly, Respect the Stop Signboard, Create Safety for Community," to promote speed control and compliance with stop signs and lines. The placards and stickers featured slogans, such as "One stop keeps one life" and "Sure. Slow down," to encourage safe driving for drivers.



Source: JET

Figure 6.3.31 Flyers, Placards, and Posters Used in Traffic Safety Campaign (First Year)



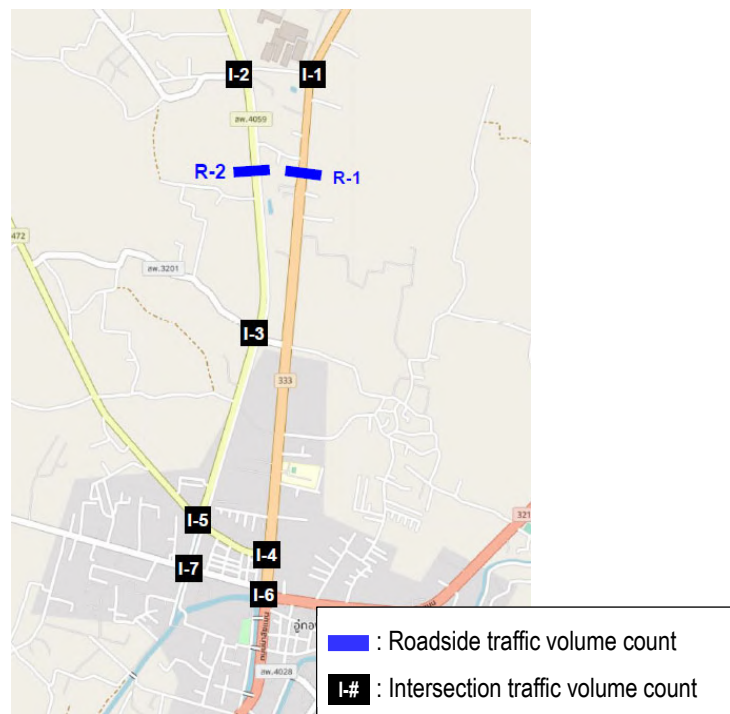
Source: JET

Figure 6.3.32 Banner Used in the Traffic Safety Campaign (First Year)

(2) The Second Year

1) Road Facilities Improvement Plan

Intersections were the focus of the second-year pilot project. Accident data confirmed that traffic accidents frequently occur at intersections in Suphan Buri Province. A traffic survey was conducted to understand the traffic situation in the pilot area to study the proposed countermeasures.

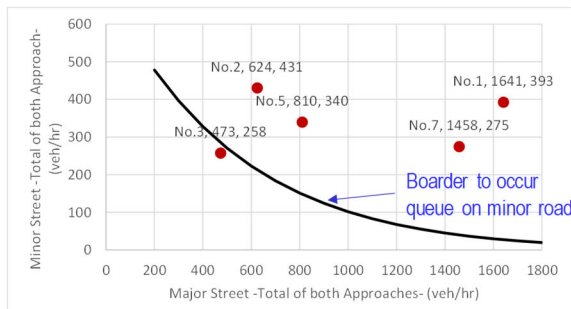


Source: JET

Figure 6.3.33 Location of Traffic Survey

The criteria for signal installation and the results of the traffic survey are shown in Figure 6.3.34, depending on the traffic volume at the intersections. There were seven unsignalized intersections in this area, of which six operate without signals despite traffic volumes exceeding those when signals should be installed. Route 4059, under DRR jurisdiction, is a roadway designed for passenger vehicles, but large trucks and trailers also travel on this road, which is larger than the designed vehicle fleet.

- Intersection No.1, 2, 4, 5, 6, 7 shall be signalized under Japanese and US standard.
- Traffic volume at intersection No.3 also mostly reach to the traffic volume of necessity of traffic signal.



AM Peak Hour Traffic Volume (PCU/h)

	North - South	East - West	Total	Time
No.1	1462	476	1938	7:30-8:30
No.2	388	663	1051	7:30-8:30
No.3	452	242	694	7:15-8:15
No.4	2096	248	2344	7:00-8:00
No.5	428	606	1034	6:45-7:45
No.6	3161	2952	6859	7:00-8:00
No.7	275	1458	1733	6:45-7:45

PM Peak Hour Traffic Volume (PCU/h)

	North - South	East - West	Total	Time
No.1	1641	393	2034	15:45-16:45
No.2	431	624	1055	15:30-16:30
No.3	473	258	731	15:30-16:30
No.4	2419	455	2874	16:45-17:45
No.5	340	810	1150	16:30-17:30
No.6	3314	2832	7062	16:00-17:00
No.7	247	1304	1551	15:45-16:45

Source: JET

Figure 6.3.34 Comparison of Signal Installation Standards and Traffic Volumes at Each Intersection

A request for guidance on the methodologies for considering intersection improvement was received from the Director of the DRR office in Suphan Buri. Therefore, a Technical Workshop on intersection improvement was organized for DRR, DOH, and RTP staff on 30–31 March 2023.

On the first day, the workshop included 1) an explanation of accident reasons based on previous survey results in the target area and 2) key points for intersection improvement, followed by a site visit for the current condition audit and discussion of proposed measures. On the second day, the workshop focused on the DRR and DOH engineers, with lectures on planning and design of intersection improvement from a road and traffic engineering perspective. Afterward, the discussion was on the countermeasures based on these insights.

Table 6.3.12 Program for Day 1 of Technical Workshop (March 30)

Time	Contents	Member
9:00 – 9:05	Opening Remarks	DRR
9:05 – 9:10	Self-introduction	All
9:00 – 10:00	Explanation of result of traffic accident data analysis using various sources (TRAMS, iRAP, Audit, high-risk behavior and location) in the pilot area	DRR
10:00 – 11:00	Finding risks through video data analysis	JET
11:00 – 12:00	Lecture for key points for intersection improvement	JET
12:00 – 13:00	<i>Lunch break</i>	
13:00 – 15:00	Site visit and discussion	All

Source: JET

Table 6.3.13 Program for Day 2 of Technical Workshop (March 30)

Time	Contents	Member
9:00 – 10:20	Lecture and exercise for intersection improvement planning 1	JET
10:40 – 12:00	Lecture and exercise for intersection improvement planning 2	JET
12:00 – 13:00	<i>Lunch break</i>	
13:00 – 15:00	Exercise of intersections improvement planning in the pilot area	each group

Source: JET

Table 6.3.14 Number of Participants by Organization

Organizations	Day 1 of Workshop	Day 2 of Workshop
DRR Headquarters	2 people	2 people
DRR Suphanburi Office	5 people	4 people
DOH Head Headquarters	3 people	2 people
DOH Suphanburi Office 2	3 people	2 people
DOH Suphanburi Office 1	2 people	–
DOH Bureau 12	2 people	–
RTP U Thong Police Station	2 people	–
Total	19 people	10 people

Source: JET

Project Completion Report



Source: JET

Figure 6.3.35 Technical Workshop

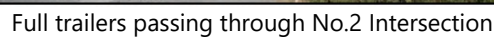
A review of the current road structure in the Technical Workshop for risk spots No. 1, No. 2, No. 3, No. 4, and No. 5 revealed that the road was designed for passenger car use but is currently frequently used by semi-trailers and full trailers (large vehicles)—vehicles of a higher standard than the designed vehicles. As a result, when large vehicles make right or left turns at intersections, they are required to extend into the opposite lane or pass on the stop line of the opposite lane, creating a dangerous situation. Therefore, although countermeasures cannot be implemented immediately, DRR Suphan Buri Office staff prepared a medium- to long-term road improvement plan, including road widening, for the intersections at risk spots No. 1, No. 2, and No. 5, based on the contents of the Technical Workshop.



Drawings of proposed improvements at No. 2 intersection

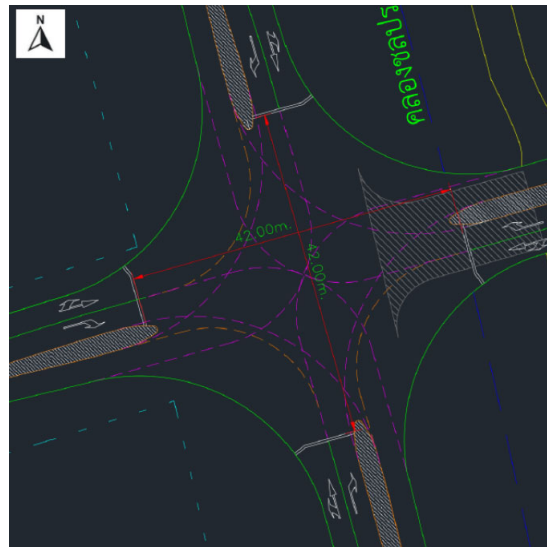
Figure 6.3.36 Medium- and Long-term Countermeasures for No.2 Intersection

Office conducted the study and prepared the drawings.



Improvement of vehicle path for left-turn

Figure 6.3.37 Current Situation of No. 2 Intersection



Source: DRR Suphan Buri Office

Figure 6.3.38 Improvement Plan of No. 2 Intersection

The engineering measures, as well as the revisions made by DRR based on the results of the review from JET, were discussed. A decision was reached regarding the proposal to relocate the stop line behind the signal location after confirming the visibility from the stop line at the site.



Source: DRR Suphan Buri Office, JET

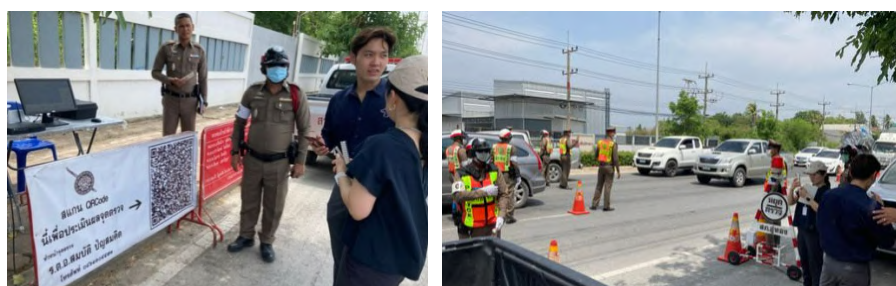
Figure 6.3.39 Revised Drawings and Site Visit

2) Traffic Enforcement Program

A) Training

In conjunction with the start of the second year, the RTP headquarters and the U-thong police had discussed the implementation of training in June. In May 2023, the RTP headquarters and the U-thong police inspected the heavy vehicle traffic situation, one of

the characteristics of the area, and discussed the details of the training schedule. In U-thong, traffic violations are enforced during hours when heavy vehicle traffic is restricted (7:00 to 9:00 a.m.). Additionally, at the intersection of Risk Spot No. 5, traffic signal timing is manually changed by the traffic police, and the details and the current signal cycle are also confirmed. In June, the team observed traffic enforcement through checkpoints in the pilot project area to confirm how to enforce various traffic violations (e.g., not wearing helmets, driving under the influence, etc.), but the training could not be conducted due to a lack of cooperation from the MOT.



Source: JET

Figure 6.3.40 Observation of Traffic Violation Enforcement by Checkpoints



Source: JET

Figure 6.3.41 Observation of Traffic Enforcement during Restricted Hours against Large Vehicles (left observation; right: manual signal operation)

3) Traffic Safety Education Program

A) Poster Contest

On 31 May 2023, the DRR had a meeting at Ban Nong Haen School for the poster contest to explain the competition outline and request the creation of traffic safety posters in the school.

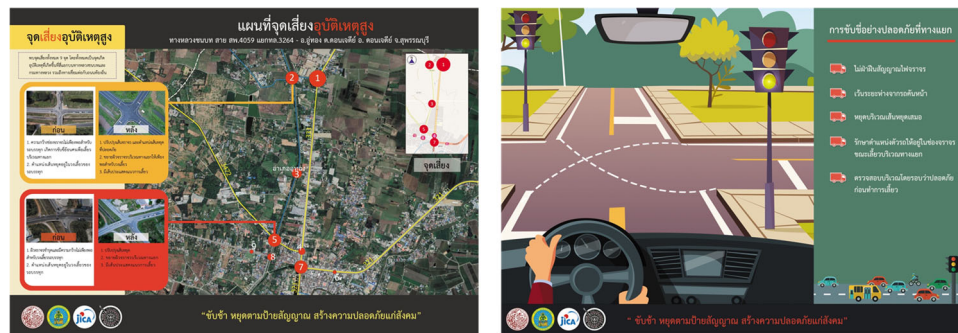


Source: JET

Figure 6.3.42 Prior Explanation for Poster Contest (Second Year)

B) Traffic Safety Campaign

Similar to the first year's traffic safety campaign, banners and placards were prepared, and flyers for distribution to drivers included risk spots and details of measures taken to raise awareness of traffic safety at intersections (Figure 6.3.43). The safety awareness content was decided after discussions with the DRR and TSOC, based on the analysis of accidents within Suphan Buri Province, focusing on "Warning at intersection, especially to drivers of passenger car and motorcycle about overall carefulness towards large trucks."



<Front>

<Back>



Source: JET

Figure 6.3.43 Flyer and Posters Used in a Traffic Safety Campaign (Second Year)

(3) The Third Year

1) Road Facilities Improvement Plan

The policies for countermeasures against dangerous behaviors, "straight section: over speed, lane change or turning," identified from the Near-miss Questionnaire and drone surveys were determined as follows:

- Setting speed limits corresponding to the road geometry
- Raising awareness by installing signs and stop lines
- Preventing right turns into and out of narrow streets or stores onto the main road
- Creating a safe walking environment at pedestrian crossings

Based on these policies, measures were summarized as shown in Table 6.3.15. Due to discussions with the community and DRR's budget limitations, it was decided to target countermeasures at 3 km+000 (Y-intersections on straight sections) and 3 km+200 (pedestrian crossings on straight sections).

Table 6.3.15 A List of Engineering Measures for the Third Year

Location	Proposed Countermeasures
2 km+800	· Decelerate (slow down) sign (wider design). · Notice of an intersection through a signboard · Stop sign (narrow street) · Prevention of right turning by poles · Limited speed of the section shall fit with road alignment and roadside environment
3 km+000	· Notice of an intersection through a signboard · Prevention of right turning using poles · Perpendicular relocation of pedestrian crossing
3 km+200	· Improve traffic flow by installing traffic islands.
3 km+400	· Clarification of pedestrian crossing by colored pavement. · Prevention of right turning using poles
6 km+300	· Notice of an intersection through a signboard · Stop sign (narrow street) · Indication of intersection through road markings · Improvement of visibility by cutting trees

Source: JET

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2) Traffic Enforcement Program

In a stakeholder meeting with representatives from RTP, DRR, RTP, DDPM, municipal government, community leaders, and industrial estate managers, an RTP officer mentioned that despite conducting various activities to promote wearing helmets for motorcyclists in Samut Sakhon, the compliance rate has not improved. In response, a JET member who was a former Japanese police officer explained that traffic violations result in a one-point deduction as part of the penalties for not wearing helmets in Japan. He also explained that accumulating up to 15 traffic violation points leads to a driver's license suspension. The participants then understood that the driver's license point system in Japan is a way to encourage safe driving practices.

One of the targets for safety awareness in the traffic safety campaign was motorcycle drivers not wearing helmets. During the campaign, using flags to safely guide and stop vehicles, as proposed by JET, was implemented. There was also an exchange of opinions regarding the deployment of a police officer and its role in ensuring safety. It was also proposed that residents distribute flyers with messages about how wearing helmets saves lives when police officers stop the vehicles.



Source: JET

Figure 6.3.44 Stakeholder Meeting

During the second workshop on 25 April, JET explained the contents of the traffic safety campaign to the participating RTP executives. The method for safe vehicle guidance and stopping using flags was introduced as a Japanese example. JET requested RTP executives to deploy at least four police officers to ensure safety during the traffic safety campaign.

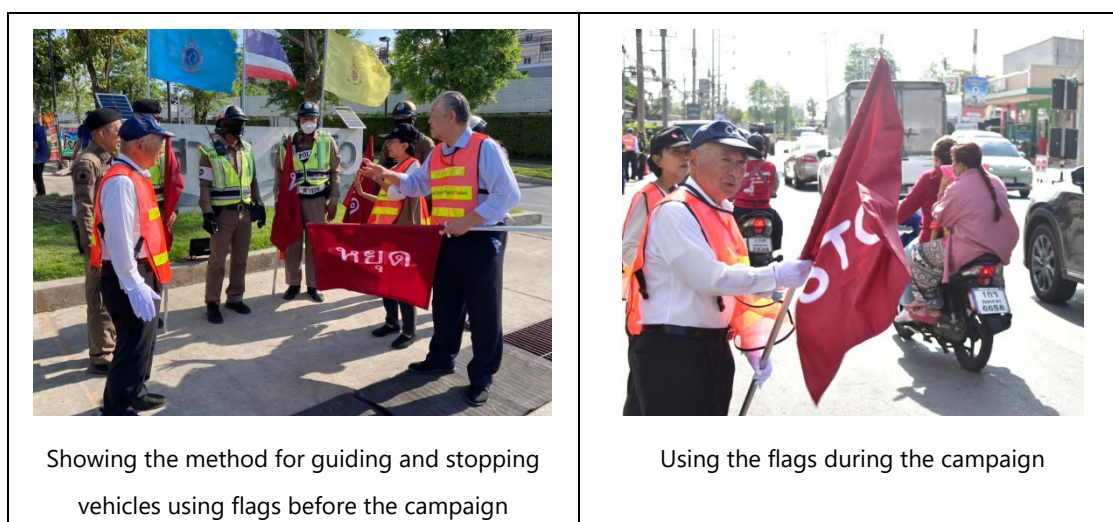


Source: JET

Figure 6.3.45 Explanation of Traffic Safety Campaign in the Workshop

Nine police officers participated in the traffic safety campaign on 26 April: four (one conductor, one deputy conductor, two traffic controllers, and one police officer) from the Samut Sakhon Provincial Police, three (police officers) from the Muang Samut Sakhon District Police Station, and two (police officers) from the Khok Kham Police Station.

Before the traffic safety campaign, JET instructed the police officers on their deployment and the method of using flags.



Source: JET

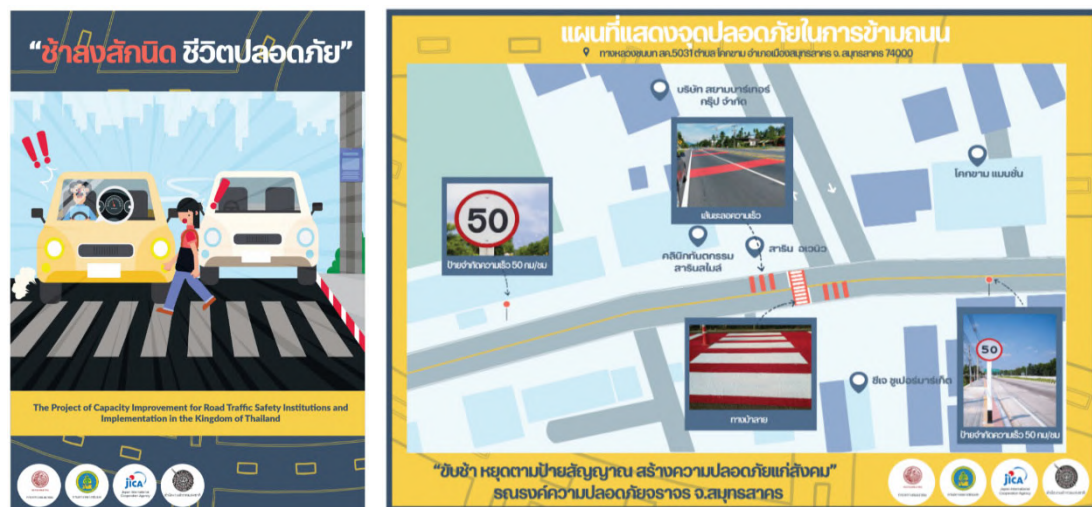
Figure 6.3.46 Explanation of Safe Vehicle Guidance during Traffic Safety Campaign

3) Traffic Safety Education Program

The poster contest for the students could not be held since it was summer vacation. Therefore, only the traffic safety campaign was conducted.

A) Traffic Safety Campaign

As in previous traffic safety campaigns, DRR prepared banners and placards, as well as flyers, to distribute to drivers with the details of the countermeasures implemented and raise traffic safety awareness at pedestrian crossings. The contents of the campaign were "Speed-Down when driving," "Appropriate Vehicle Parking out of the street," and "Helmet wearing of motorcyclists," based on the comments at the first workshop and the results of the near-miss questionnaire. DRR decided on the message for the flyers based on the content of the awareness campaign.



Source: JET

Figure 6.3.47 Content of the Flyer

6.3.4 Assistance of the MOT and Organizations Concerned to Implement the Comprehensive Road Safety Programs

(1) The First Year

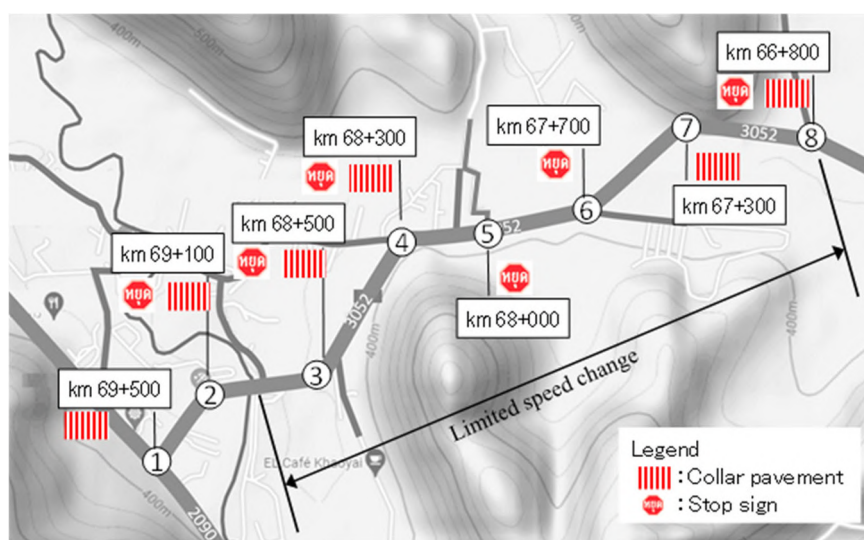
1) Road Facilities Improvement

The engineering countermeasures in Nakhon Ratchasima Province are shown in Table 6.3.16, and the locations are shown in Figure 6.3.48. DRR implemented the engineering countermeasures according to the plan shown in 6.3.3.

Table 6.3.16 Engineering Implementation Details (First Year)

Countermeasures	Purpose	Quantity	Photo
Colored pavement	Warning in risk spots	6 spots	
Installation of stop signs and stop lines	Stop lines placed at appropriate locations ensure visibility	6 spots	
Review of speed limits	Appropriate speed for the road structure	3 km	

Source: JET

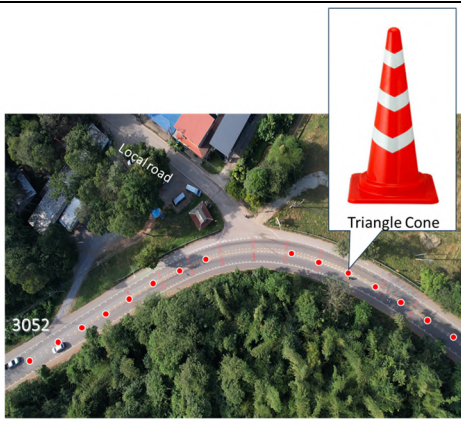


Source: JET

Figure 6.3.48 Engineering Implementation Location (First Year)

At risk spot no. 4 (Km 68 + 300), a video camera recorded vehicle behavior, and vehicle speeds were measured before and after implementing the countermeasures. The results showed that colored pavement was not sufficiently effective. On Route 3052, there are many areas with colored pavement, but it is thought that the lack of a unified pattern of colored pavement has not led to alerting road users. Therefore, the countermeasures applied were installing post cones on the center line and displaying warning messages on

variable message signs (VMS).

	
Location	Installation status

Source: JET

Figure 6.3.49 Additional Countermeasure for Post Cone Installation

2) Strengthen Enforcement and Traffic Safety Education

The enforcement and education activities of the pilot projects shown in Table 6.3.17 were conducted on 25–27 November 2022. For engineering, intersection improvements were conducted before those dates.

Table 6.3.17 Activity Items and Respective Schedule in the Second Year

Item	Contents
Enforcement	- Enforcement training for RTPs on 21–24 November - Lecture for resident representatives on the need to halt at the stop line at a workshop on 25 November - Distribution of publicity materials on the need for pausing at the stop line on 25–27 November - Strengthen stop-and-go enforcement (27 November)
Education	- Lecture and distribution of public information materials on dangerous behaviors, including speeding and stopping, at the workshop for community leaders on 25 November. - Schools near the pilot area had a traffic safety poster contest, with the best posters awarded. - Road safety campaigns were conducted on 26 and 27 November, together with community leaders and related organizations.

Source: JET

A) Enforcement

a) Activities to Raise Awareness on Needing to Halt at the Stop Line

A temporary stop enforcement activity was carried out in the pilot area on November 27. However, only a few police officers could participate for three consecutive days. The project members determined that the police officers did not have sufficient training on the actual enforcement of issuing tickets. Instead of enforcement, the participating police officers distributed flyers to passing vehicles about the necessity of stopping at intersections.

The purpose of the activity was to ensure that the participants fully understood the following three points:

- 1) "Clear instructions." Clearly communication of the instructions from the officer to the driver.
- 2) "Positioning of police officers during operations." Maintain sufficient distance from enforcement points, such as the stop line or intersection.
- 3) "Polite response." Be polite and courteous to gain so drivers and residents understand the enforcement.

Traffic enforcement is widely recognized as a challenging task, not only for the drivers of targeted vehicles but also for those driving in the vicinity, particularly for police officers, due to the heightened risk of accidents. Unless all parties involved, including the police, take sufficient precautions to avoid accidents, sustained traffic enforcement efforts will remain elusive. While this activity may not involve ticketing, it necessitates similar actions to official enforcement operations, such as approaching moving vehicles. "Clear instructions" entails police officers indicating their position and intentions to stop. "Positioning of police officers during operations" aims to prevent drivers from being caught off guard and causing accidents. Police officers strategically position themselves so drivers easily notice police instructions rather than being near intersections where they may be focused on other actions like making turns. Furthermore, when officers issue tickets, it's crucial to minimize provoking a driver's emotions through a "Polite response." Enforcement activities should prioritize calm communication to encourage offending drivers to amend their traffic behavior.

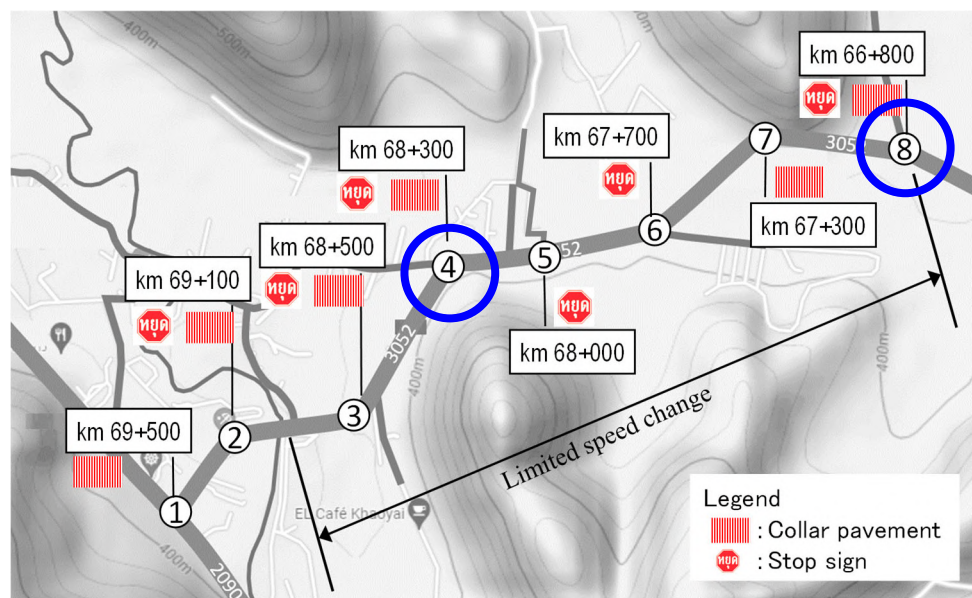
[Outline of Activities to Raise Awareness of the Need to Pause at the Stop Line]

■ Items of Training toward RTP:

- 1) "Clear instructions"

Project Completion Report

- 2) "Positioning of police officer at the operations"
 - 3) "Polite response"
- Participants: 5 police officers
 - 1 officer, Pol.Capt, Deputy Inspector, Prevention and Suppression Department, Musi Police Station,
 - 2 officers, Pol. L/C. Squad Leader, Prevention and Suppression Department, Musi Police Station,
 - 2 officers, Pol. L/C. Squad Leader, Prevention and Suppression Department, Pak Chong Police Station
 - Time: 9:30–10:30 AM
 - Location: (4) and (8) on 3054 Road (refer to figure below)



Source: JET

Figure 6.3.50 Locations of Activities to Raise Awareness of the Need to Pause at the Stop Line

As shown in the photos taken during the training and public awareness activities, red stop flags were used. These flags are not typically utilized in the RTP. It was prepared by the Project based on the advice of former Japanese police officers. In order to prevent accidents resulting in injury to police officers and ensure smooth enforcement, it is necessary to convey information to drivers in an easy to understand manner. One conductor and four police officers carried out this activity at two locations for about 40 minutes each, targeting about 100 vehicles.



Source: JET

Figure 6.3.51 Activities to Raise Awareness of the Need to Halt at Stop Lines

After the activities, the JICA experts, who are former police officers, commented, "The guidance was polite, smooth, and confident. The drivers accepted the guidance of the police officers with open arms." The participating police officers responded to the questions related to their evaluation, including whether they fully understood the instructional content. The following are their comments.

Table 6.3.18 Self-evaluations of Participating Police Officers

Training Items	Satisfied	Unsatisfied	Satisfaction Ratio (%)	Comments
1) Clear instructions (safe vehicle guidance and stopping using flags)	4	1	80%.	• "The use of red flags seemed appropriate once we became familiar with them." • "The flags are difficult to use on narrow roads."
2) Positioning of police officers during the operations (roles and ensuring one's own safety)	4	1	80%.	• "I felt that the distance from intersections was long, but I understood the positioning is more on the consideration for safety." • "The stop line itself is further away from the intersection."

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				• "Curve mirrors, etc., should also be installed (by the road administrator)."
3) Polite response (respectful treatment of residents and drivers)	5	0	100%.	• "The residents and drivers were very cooperative." • "It was the first time for me to be aware of how to respond, including handing out flyers, but I am glad I had the experience."
Total	13	2	86.7% (%)	-

Source: JET

Comments such as "the stop line itself is further away from the intersection" and "curve mirrors, etc., should also be installed" indicate that the present intersection could lead to accidents even if drivers and police officers keep a sufficient distance from the intersection and stop line when conducting their duties. The project members explained to the participating officers that the public awareness activities could be used as proof to propose further road improvement to the road administrator.

b) Follow-up activities

As a follow-up to the activities in the first year, in May 2023, JET visited the Musi Police Station with RTP Headquarters staff to interview the chief about the current traffic situation in the pilot project area and explain the effectiveness of repeated enforcement based on past Japanese experience. They also visited the pilot area with the police officers who participated in the raising awareness campaign on the need to halt at stop lines, and together, they confirmed the importance of the three guidance points and advised on their enforcement.



Source: JET

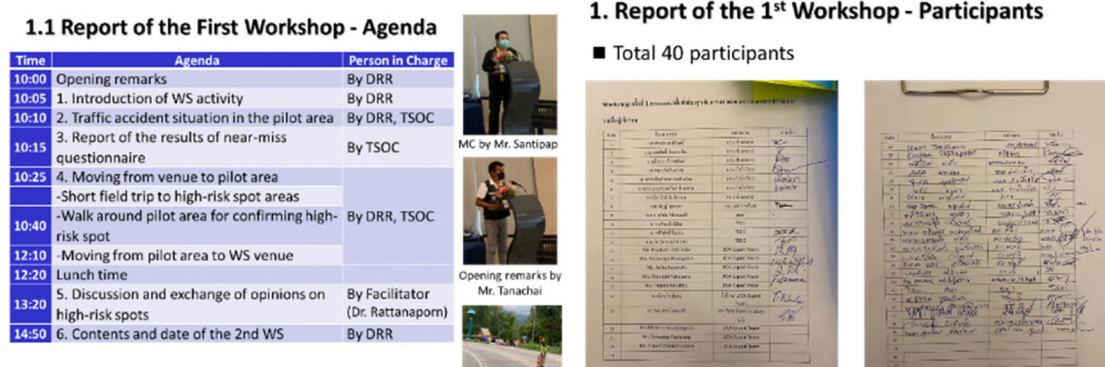
Figure 6.3.52 Follow-up Activities to Pilot Areas

In January 2024, the chief of the police department also commented to the RTP Headquarters that the police stations have been applying the knowledge they learned from the training to their daily police work and traffic accidents are decreasing.

B) Education

a) First Workshop

The first workshop was held on 18 March 2022. Forty participants, including community members, were divided into two groups to walk and identify risk spots after DRR and TSOC explained the traffic accident results and near-miss questionnaire. The community walk was conducted with safety precautions, including having the participants wear safety vests created for publicity purposes. The facilitator then asked the participants to give their opinions on the issues and countermeasures identified during the walk by writing them on sticky notes and pasting them on a large map.



Source: JET

Figure 6.3.53 Agenda of the First Workshop (left) and List of Participants (right)

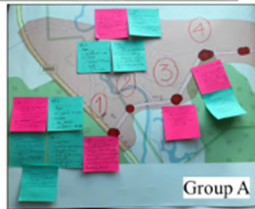


Source: JET

Figure 6.3.54 Walk around Pilot Area and Discussions

Project Completion Report

**1.2 Report of the 1st Workshop
– Results of Site Visit and Discussion**



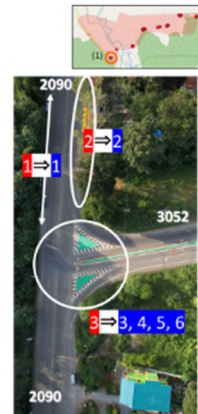
1.2 Risk spot No.1

Issue

- 1 Drivers tend to drive at high speed
- 2 Parking on the side of the road for shopping
- 3 Lack of warning sign

Comments on Countermeasures

- 1 To enforce the law on high-speed driver in the area
- 2 Community and government should cooperate to find solution(s) for managing street vendor, such as providing a place to sell items so that they don't park on roadside.
- 3 To prepare road signs or road marking to inform them that there is a turn-left point ahead.
- 4 To install signage(s) so that drivers can see it clearly and easily.
- 5 To install a speed bump to slow down the speed of the vehicle.
- 6 To add more traffic signal.



Source: JET

Figure 6.3.55 Opinions Pasted on the Map (left) and Their Organization (right)

b) Second Workshop

The second workshop was on 8 July 2022 to explain and discuss the proposed countermeasures based on the comments received from the first workshop. The workshop venue was at Ana Hill Resort Khao Yai, and 48 participants (5 from DRR HQ, 6 from DRR Branch, 10 from the community, 16 from RTP, 2 from DLT Branch, 3 from TSOC, and 6 from JET) attended. During the discussions on traffic violation enforcement, a community leader commented that there are many traffic violations, such as driving on the wrong side of the road, and although he is aware that this is not good practice, it has become a habit. In response, community leaders commented on the need for cooperation in teaching and educating people to obey traffic rules, as the police alone cannot enforce them. In the exchange of opinions on hardware countermeasures, there was a comment that speed humps should be installed to control speed, but it was also discussed that red road surface markings should be used to alert road users.

c) Third Workshop

A traffic safety poster contest by students was held in November 2022 at the two schools around the pilot project to increase interest in traffic safety among students and their parents. The third workshop was on 25 November 2022, with DRR explaining the implemented countermeasures and RTP explaining dangerous behavior, traffic rules, and enforcement. A pilot project for enforcement and traffic safety campaign was conducted on 26–27 November 2022. The winning posters of the poster contest were distributed

along the roadside during the traffic safety campaign.

d) Poster Contest

In November 2022, a poster contest was held at Ban Prang Kla School and Khao Yai Pittayakom School. The objective of the poster contest was to enhance the awareness of traffic safety among teachers and students in schools around the pilot area.

After explaining the purpose of the poster contest and its objectives to the schools, the students had two weeks to create traffic safety-related posters. The five best works were selected and awarded, and these winning entries were printed and used to convey messages to drivers during traffic safety campaigns (Figure 6.3.56).



Source: JET

Figure 6.3.56 Use of Posters in Traffic Safety Campaign

e) Traffic Safety Campaign

The traffic safety campaign was carried out over two days, from 26 November (Saturday) to 27 November (Sunday) 2022, as shown in Table 6.3.19. Approximately 40 participants, including residents, teachers, and students, joined the two-day workshop. The traffic safety campaign was designed to involve students, aiming at current and future drivers. A teacher who joined the campaign mentioned that he believes having students draw posters and think about traffic safety, as well as practicing the campaign, increases their traffic safety awareness. The created posters will be taken home and become a conversation starter about traffic safety with their parents.

Table 6.3.19 Time Schedule of the Traffic Safety Campaign

Date	Time	Activities
26 and 27 NOV. 2023 (SAT, SUN)	08:30	Meet and gather
	08:30- 09:00	Safety briefing and campaign execution briefing for everyone
	09:00- 09:15	All participants will take their positions
	09:15- 10:30	Campaign activity (+media cover)
	10:30- 10:50	Restroom break in turns
	10:50- 11:50	Campaign activity (+media cover)
	11:50- 12:00	Group photo session

Source: JET

During the safety campaign, the participants were assembled accordingly for their security in cooperation with the traffic police, as shown in Figure 6.3.57. The campaign was without any accidents.



Source: JET

Figure 6.3.57 Cooperation of Traffic Police

(2) The Second Year

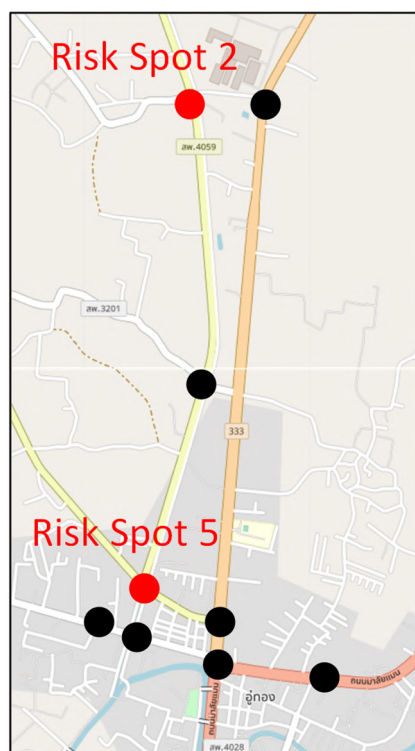
1) Road Facilities Improvement

The status of the engineering implementations in Suphan Buri is shown in Table 6.3.20, and their locations are shown in Figure 6.3.58. DRR carried out the construction in accordance with the plan described in Chapter 6.3.3.

Table 6.3.20 Photos of Engineering Measure in Suphan Buri

	Before	After
Risk spot no. 2		
Risk spot no. 5		

Source: JET



Source: JET

Figure 6.3.58 Targeted Risk Spots for the Engineering Measures

2) Strengthen of Enforcement and Traffic Safety Education

The pilot project in the second year was scheduled for three days from 22 June (Thursday) to 23 June (Friday) 2023. It comprises activities in terms of enforcement and education.

Table 6.3.21 Details of Pilot Project Implementation

Items	Contents
Enforcement	· No training could be conducted due to the lack of cooperation from MOT. · Helmet-wearing instruction during the traffic safety campaign on June 23
Education	· Lecture at the workshop, with community members as the participants, about road safety activities and the risk of road accidents in the pilot area. · The traffic safety poster contest was conducted at the schools near the pilot area, with awards given to the best posters. · The traffic safety campaign was held along the roadside with community representatives and other concerned parties.

Source: JET

A) Enforcement

a) Helmet and Seatbelt Wearing Instruction in Traffic Safety Campaigns

During the traffic safety campaign on 23 June, RTP joined by utilizing the distribution of

flyers used in the campaign, in addition to the usual helmet-wearing instruction for all motorcycle drivers not wearing helmets. Similar to the first-year pilot project activity, the project prepared a replica of the stop flag used by Japanese police officers. JETs instructed how to use the flags to the participating police officers, and those were used for the vehicle stops.



Source: JET

Figure 6.3.59 Traffic Safety Campaign (left: giving instructions for those not wearing helmets; right: stopping using stop flags)

Although the training was not conducted, the police officers who participated in the series of workshops and campaign activities were asked about the instructional items they focus on when conducting activities, as in the first year. The following responses were obtained.

Table 6.3.22 Self-evaluations of Participating Police Officers

Training Items	Satisfied	Unsatisfied	Satisfaction Ratio (%)	Comment
1) Clear instructions (safe vehicle guidance and stopping using flags)	6	0	100	• "Enforcement using stop flags is effective." • "White gloves are also easy to use and seems contributing to secure the safety of policemen and the drivers."
2) Positioning of police officer during the operations (roles and ensuring one's own safety)	3	3	50%.	• "It was helpful to share information about the enforcement arrangement taken by the Japanese police." • "There does not seem to be any significant difference (based on prior discussions) between the Japanese and Thai placements."
3) Polite response (respectful treatment of residents and drivers)	6	0	100%	• "We usually do not work together with participants from other organizations, and I think it was very effective."
Total amount	15	3	83.3%	-

Source: JET

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Two of the six police officers answered positively to the questionnaire at the end of their second year of activities at both companies, indicating the positive effects of their participation in campaign activities, including discussing traffic safety with their families.

B) Traffic Safety Education

a) First Workshop

The first workshop was on 9 December 2022 in U-Thong District, Suphan Buri Province, the pilot area for the second year. The workshop was held at U-Thong Technical College, and the participants were DRR, DLT, RTP, the local authority, students, local companies, and residents. The workshop focuses on identifying traffic accident risks spot in the pilot area.

Time	Program	Person in Charge
9:00	1. Opening remark	DRR
9:05	2. Introduction of Participants	DRR
9:10	3. Introduction of the WS activity	DRR
9:15	4. Traffic accident situation in the pilot area	DRR and RTP
9:45	5. Development of near-miss map	Facilitator
	5.1 Plot near-miss point on A3 map	All
	5.2 Answer to near-miss questionnaire	All
11:00	6. Site survey at the location with many near-miss experience	All
12:30	7. Lunch time	All
13:30	8. Traffic accident situation in the pilot area	DOH and DLT
13:45	9. Discussion about site survey results	Facilitator
14:30	10. Closing Remarks	DRR

Source: JET

Figure 6.3.60 Agenda of the First Workshop (Second Year)

Through the workshop, the following hazardous areas were identified. Most of them were intersections.



Source: JET

Figure 6.3.61 First Workshop (left) and Identified Risk Spots (right) (Second Year)

b) Second Workshop

The second workshop was on 22 June 2023 to explain the engineering-based countermeasures implemented by DRR based on the comments obtained in the first workshop, confirm the status of the countermeasures at the site, and discuss the results of the site check. The venue was U-Thong Industrial and Community Education College, with 60 participants, including residents and students.



Source: JET

Figure 6.3.62 Second Workshop

c) Poster Contest

A poster contest was held in June 2023 at the schools in the vicinity of the pilot area (Figure 6.3.63). JET held the contest in the first year, but in the second year, DRR Suphan Buri staff joined in explaining the poster contest and awarding ceremony.



Source: JET

Figure 6.3.63 Participants of Poster Contest (Second Year)

d) Traffic Safety Campaign

A traffic safety campaign was conducted on 23 June 2023 (Friday), as shown in Table 6.3.23. About 40 people, including the local community, participated.

Table 6.3.23 Time Schedule of Traffic Safety Campaign

Date	Time	Activities
23 June. 2023 (Fri)	08:30	Meet and gather
	08:30- 09:00	Setting
	09:00- 09:20	Safety briefing and campaign execution briefing for everyone
	09:20- 09:30	All participants will take their positions
	09:30- 10:15	Campaign activity
	10:15- 10:35	Restroom break in turns
	10:35- 11:20	Campaign activity
	11:20- 11:30	Group photo session

Source: JET

As shown in Figure 6.3.64, a system was established with the help of the traffic police to safely stop vehicles. Traffic police actively guided traffic violators and showed a positive attitude toward reducing traffic accidents.



Source: JET

Figure 6.3.64 Cooperation of Traffic Police (Second Year)

(3) The Third Year

1) Road Facilities Improvement

DRR Samut Sakhon office implemented the countermeasures at the three locations, as shown in Table 6.3.24.

Table 6.3.24 List of Engineering Countermeasures (Third Year)

Location	Countermeasures	Photos
2 km+800	- Installation of safety poles - Revision of speed limits (50 km/h)	

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3 km+000	- Color paving of pedestrian crossing - Revision of speed limits (50 km/h)	
3 km+400	- Color paving of pedestrian crossing - Revision of speed limits (50 km/h)	

Source: JET

2) Strengthen Enforcement and Traffic Safety Education

A) Enforcement

a) Helmet-wearing instruction in traffic safety campaigns

Nine police officers joined in the traffic safety campaign on 26 April 2024. The vehicle guidance and stopping were carried out using flags. All motorcyclists without helmets were guided to the front of the tent, where residents helped distribute flyers, and traffic police officers gave instructions on wearing helmets.



Source: JET

Figure 6.3.65 Traffic Safety Campaign (Third Year)

The nine police officers who participated in the traffic safety campaign took a questionnaire survey regarding the instructions for stopping cars provided by JICA experts. As shown in Table 6.3.25, all participants understood and were satisfied with the instructions. Some police officers initially thought that flags were used by security guards, while the traffic police guide and stop vehicles using whistles only. However, through the actual use of flags during the campaign, they realized that flags could convey police instructions to drivers farther away and understood their usefulness. Drivers followed the officers' instructions, and the campaign went safely and smoothly.

Police officers stand at three locations during the traffic safety campaign: 1) the vehicle sorting point, 2) the vehicle guidance point, and 3) the vehicle stopping point. They rotated between these positions and took breaks as needed. Officers considered their positioning to ensure safety and guided and stopped vehicles appropriately while ensuring the safety of the surrounding area.

Together with participating residents, officers distributed awareness flyers and spoke directly to each motorcyclist without a helmet. Their careful and respectful manner was highly evaluated.

Table 6.3.25 Self-Evaluation of the Police Officers

Instruction items	Satisfied	Unsatisfied	Satisfaction Ratio (%)	Comments
Clear instructions (safe vehicle guidance and stopping using flags)	9	0	100%	• "Normally, I guide vehicles by hand, so using flags felt a bit awkward". • "The flags are easy for drivers to see, but they are a little heavy."
Positioning of police officer at the operations (roles and ensuring one's own safety)	9	0	100%	• "It can also be utilized in actual enforcement."
Attentive and courteous (respectful treatment of residents and drivers)	9	0	100%	• "It was great that we were able to provide guidance and speak to traffic violators together with the community people."

Source: JET

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B) Traffic Safety Education

1) First Workshop

The first workshop was on 19 January 2024 at the Grand Inter Hotel in Samut Sakhon Province. Around 40 persons participated, including community members. DRR explained the traffic accident situation in the pilot area. Subsequently, a survey on near misses was conducted. After creating a near-miss map, the participants visited the pilot area to identify three high-risk areas and discussed issues identified during the visit and countermeasures to mitigate those issues.

Time	Program	Person in Charge	Remarks
9:00	1. Opening remark	DRR and DDPM	
9:05	2. Introduction of Participants	DRR HQs	
9:10	3. Introduction of the WS activity	DRR HQs	
9:15	4. Traffic accident situation in the pilot area	DRR provincial office	
9:25	5. Development of near-miss map	Facilitator	
	5.1 Plot near-miss point on A3 map	All	Aggregate individual near-miss points (A3 map) on A0 map
	5.2 Gather near-miss experience to A0 Map	All	
10:50	6. Site visit of risk spots	All	Select worst 3 locations
12:35	7. Lunch time	All	
13:30	8. Discussion about site survey results	DRR HQs	- What near-miss occurred - How dangerous it was
14:30	9. Closing Remarks	DRR	

Source: JET

Figure 6.3.66 Agenda of the First Workshop (Third Year)



Source: JET

Figure 6.3.67 First Workshop (Third year)

2) Second Workshop

On 25 April 2024, the second workshop was held at the Grand Inter Hotel in Samut Sakhon Province with 40 participants, including residents. In the workshop, DRR reviewed the contents from the first workshop, JET presented successful traffic accident prevention examples in Japan, and traffic accident risks in the pilot area were discussed. DRR Samut Sakhon office explained the implemented engineering countermeasures, conducted a joint safety audit on-site and discussed the countermeasures.

Time	Program	Person in Charge	Remarks
9:00	1. Opening remark	DRR provincial office	
9:05	2. Introduction of Participants	All	
9:10	3. Review of 1st workshop	DRR HQs	
9:30	4. Explanation of risk	JICA Expert Team	
10:00	5. Explanation of countermeasures	DRR provincial office	
10:30	6. Site visit of risk spots	All	2 locations
12:00	7. Lunch time	All	
13:00	8. Discussion about site survey results	DRR HQs	
14:00	9. Closing Remarks	DRR provincial office	

Source: JET

Figure 6.3.68 Agenda of the Second Workshop in Samut Sakhon (Third Year)

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Source: JET

Figure 6.3.69 Second Workshop (Third Year)

c) Traffic Safety Campaign

The traffic safety campaign for the third year was on 26 April 2024 (Friday), following the program shown in Figure 6.3.70. There were 40 participants, including the residents who participated in the campaign.

Date	Time	Activities
26 th April 2024 (FRI)	08:30	Meet and gather *RTP set safety corns for the campaign
	08:30- 09:00	Safety briefing and campaign execution briefing for everyone from DRR
	09:00- 09:10	All participants will take their positions
	09:10- 10:30	Campaign activity *Restroom break as needed individually.
	10:30- 10:40	Closing Remarks from DRR
	10:40- 10:50	Group photo session
	10:50- 11:00	Lunch box and water distribution

Source: JET

Figure 6.3.70 Timeline of the Traffic Safety Campaign in Samut Sakhon (Third Year)

During the traffic safety campaign, as shown in Figure 6.3.71, the traffic police officers safely stopped vehicles while residents distributed flyers to drivers and spoke to them. The traffic police officers actively engaged in guiding traffic violators.



Figure 6.3.71 Traffic Safety Campaign in Samut Sakhon Cooperated with Traffic Police (Third Year)

6.3.5 Development of the Monitoring and Evaluation Method to Measure the Effectiveness of the Comprehensive Road Safety Programs

The effectiveness of the pilot project was evaluated using changes in road user behavior and awareness and the number of traffic accidents as indicators before and after the implementation of the pilot project. The evaluation items and implementation methods are shown in Table 6.3.26.

Table 6.3.26 Evaluation Items and Implementation Methods

Item	Contents	Implementation methods
Behavior change	Speed, lane departure	DRR's existing cameras
Awareness change	Behavior change, understanding of traffic rules, compliance with traffic rules	Questionnaire survey
No. of traffic accident	No. of traffic accident	ARMS

Source: JET

(1) The First Year

1) Behavior Change

DRR evaluated the effectiveness of the countermeasures in the pilot area in Nakhon Ratchasima. In the curved section of the pilot area, differences in vehicle travel speeds for three cases were assessed: Case 1: without VMS and post cones, Case 2: with VMS only, and Case 3: with VMS and post cones. The results, as shown in Table 6.3.27, confirm that Case 2 also has a certain effect, but Case 3 is the most effective, with a 16% reduction in average speed from 70 km/h to 59 km/h.

Table 6.3.27 Evaluating the Effectiveness of Countermeasures

	Case 1	Case 2	Case 3
VMS	-	O	O
Post cone	-	-	O
Date	2023/9/11	2023/9/18	2023/10/3
Average speed	70.5 km/h	66.0 km/h	59.5 km/h
Frequency distribution of speed zones			
No. of sample	n=1,241	n=1,283	n=1,025

Source: DRR

A power model demonstrating the relationship between changes in speed and changes in the number of accidents or accident fatalities was proposed by Goran Nilsson². This power model was used to estimate how much the number of traffic fatalities decreases with decreasing speed.

The power model is an exponential model with the following equation. The exponential part uses the exponents proposed by Rune Elvik³ (Table 6.3.28). Since the subject roads are rural, the parameters for "Rural roads/freeways" were used.

² Nilsson,G.The effects of speed limits on traffic crashes in Sweden, International Symposium on the Effects of Speed Limits on Traffic Crashes and Fuel Consumption, Organisation for Economy, Cooperation and Development(OECD),1982:Paris:France:1-8

³ Elvik,R:The Power Model of the Relationship between Speed and Road Safety: Update and New Analyses. Institute of Transport Economics, Oslo, Norway: 2009; TOI Report 1034

$$\frac{\text{Accidents after}}{\text{Accidents before}} = \left(\frac{\text{Speed after}}{\text{Speed before}} \right)^{\text{Exponent}}$$

Table 6.3.28 Exponents of Power Model

Accident or injury severity	Rural roads/freeways	Urban/residential roads	All roads
Fatal accidents	4.1	2.6	3.5
Fatalities	4.6	3.0	4.3

Source: Elvik, R, 2009

Table 6.3.29 shows the estimated reduction in fatal crashes and traffic fatalities using the power model for the VMS only case (Case 2) and both the VMS and post-cone cases (Case 3). Case 2 and Case 3 resulted in expected reductions in fatal accidents and fatalities of just under 30% and over 50%, respectively.

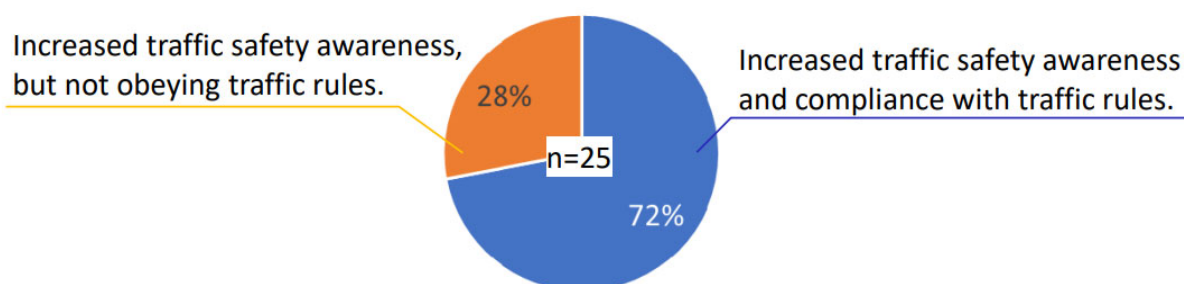
Table 6.3.29 Estimated Reduction in the Number of Fatal Accidents and Fatalities

	Decrease rate for Case 2	Decrease rate for Case 3
Fatal accidents	26.2%	51.6%
Fatalities	28.9%	55.7%

Source: JET

2) Awareness Change

Participants in the traffic safety campaign and poster contest were surveyed regarding changes in their awareness of traffic safety. As shown in Figure 6.3.72, all participants improved their awareness of traffic safety, with 72% obeying traffic rules.



Source: JET

Figure 6.3.72 Questionnaire Survey Result of the Traffic Safety Campaign Participants

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3) The number of Traffic Accidents

As shown in Table 6.3.30, 108 traffic accidents occurred on DRR roads in Nakhon Ratchasima over a four-year period, 17 of which (17% of the total number of traffic accidents) were traffic fatalities. Although the number of traffic fatalities has been decreasing, the number of traffic fatalities has remained stable at about 7 fatalities per year, or 1.6 fatalities per fatal accident.

Table 6.3.30 Traffic Accident Statistics for DRR Road in Nakhon Ratchasima

Year	No. of Traffic Accidents	No. of Fatalities Accidents	Percentage of fatal accidents	No. of Fatalities	Number of fatalities per fatal accident
2019	18	5	28%	9	1.8
2020	49	5	10%	6	1.2
2021	24	4	17%	6	1.5
2022	17	3	18%	7	2.3
Total	108	17	16%	28	1.6

Source: DRR

In order to achieve a 30% reduction in traffic fatalities would require a reduction of 2.1 traffic fatalities per year. The following is a roadmap for achieving a 30% reduction in traffic fatalities.

Table 6.3.31 shows the results of a crosstabulation of traffic accidents in Nakhon Ratchasima by road structure and accident cause. Traffic accidents caused by overspeed was the most common, accounting for 50% of all accidents.

Table 6.3.31 Traffic Accident Analysis Results in Nakhon Ratchasima

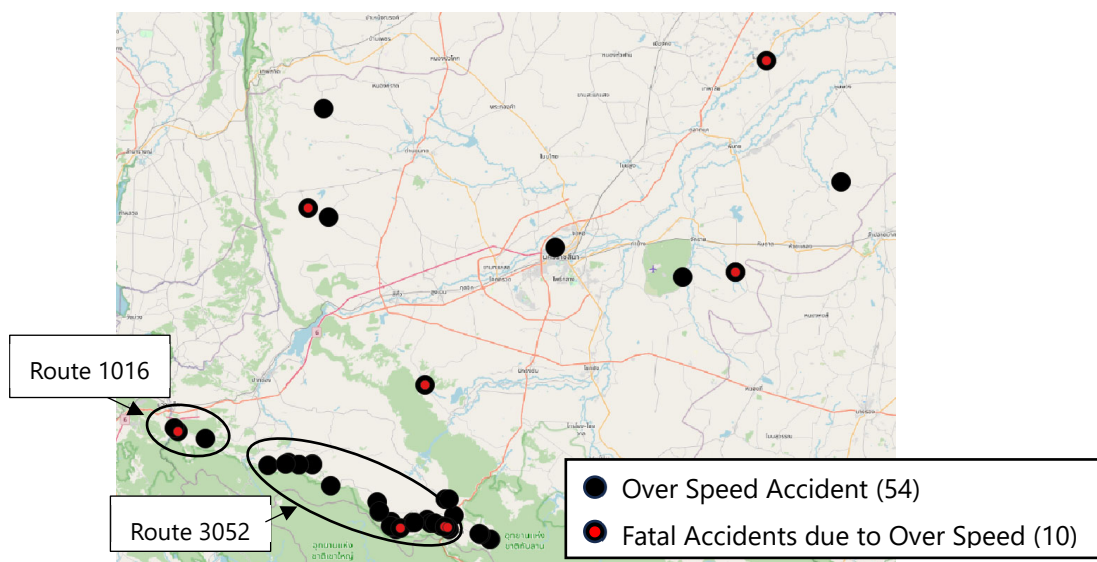
	Straight	Curve	Intersecti on	Sharp Curve	Others	Total
Over speed	11%	29%	4%	6%	0%	50%
Drunk	4%	6%	2%	0%	0%	11%
Rushing out	5%	3%	3%	0%	0%	10%
Doze off	4%	2%	0%	0%	0%	6%
Others	9%	7%	2%	4%	1%	23%
Total	32%	46%	10%	10%	1%	100%

Source: JET

The distribution of overspeed accidents in Nakhon Ratchasima (2019–2022) is shown in Figure 6.3.73. The number of fatal accidents is 10 per 4-years. Overspeed accidents are frequent on Routes No. 1016 and 3052, located in the southern part of Nakhon Ratchasima,

with 4 fatal accidents every 4 years. Efficient and effective traffic accident reduction can be achieved by implementing countermeasures first on these routes. Since the other sites where fatal traffic accidents occur are widely dispersed, it is necessary to implement countermeasures one by one.

Under "1) Behavior Change," the speed reduction effect of VMS and traffic cone installation was confirmed, and it was estimated that traffic fatalities could be reduced by 51.6%. Implementing these countermeasures at the locations where the fatal traffic accidents occur due to overspeed, as shown in Figure 6.3.73, would reduce traffic accidents by 5.2 (= 10 fatal traffic accidents due to overspeed x 51.6%) and traffic fatalities by 8.3 (= 5.2 traffic accidents reduced x 1.6 fatalities per fatal traffic accident). A 30% reduction is expected in the number of traffic fatalities (= 8.3 reduction in the number of traffic fatalities / 28 fatalities).



Source: JET

Figure 6.3.73 Distribution of Over Speed Accidents in Nakhon Ratchasima (2019-2022)

(2) The Second Year

1) Behavior Change

CCTV cameras were mounted at intersections where traffic signals were installed in the Project and at intersections without traffic signals to compare traffic accident risk.

DRR used post encroachment time (PET) in evaluating traffic accident risk within an intersection, which is the time elapsed between the point at which one of the two vehicles

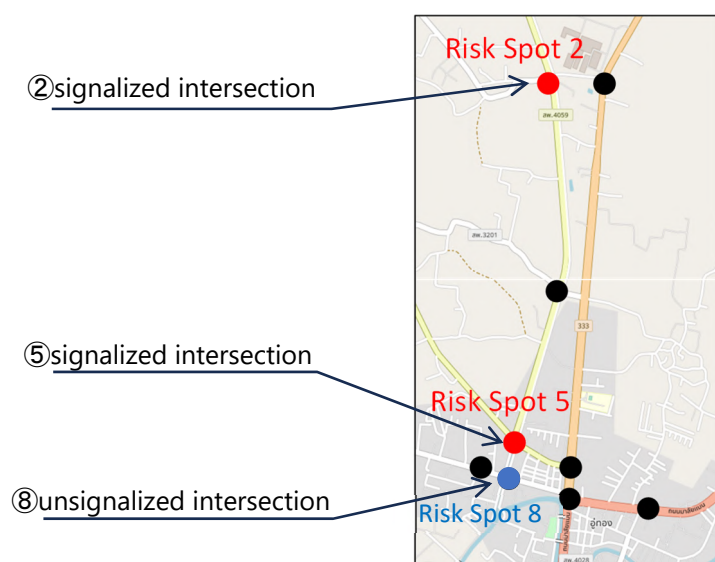
in a potential collision passed through a point and the point at which the next vehicle arrived at that point. The smaller the value of PET, the greater the danger and chance of collision when the value is 0.

Table 6.3.32 shows a summary of the PET analysis. A red circle indicates the point where the vehicles are about to collide. The counting starts after the first vehicle passes the red circle and stops when the second vehicle arrives at the red circle.

Table 6.3.32 Summary of the PET Analysis

Analysis image	Summary of analysis
	- Truck begins to turn right. - The red circle on the rear wheel of the truck marks the point where two vehicles nearly collide and pass each other.
	- A motorcycle appears going straight ahead from the shadow of the truck. - A counter is displayed by the red circle, and the count starts after the truck passes (0.47 sec on the screen).
	- Motorcycle avoids collision with truck - Counting stops after the motorcycle reaches it (0.73sec on screen). - PET value is 0.73sec, less than 1 second, indicating a very high risk of collision.

The data evaluated a total of three intersections: signalized intersections at Risk Spot 2 and Risk Spot 5 and an unsignalized intersection at Risk Spot 8 (Figure 6.3.74). The evaluation data were used for 17 days, from 31 March to 16 April 2024.



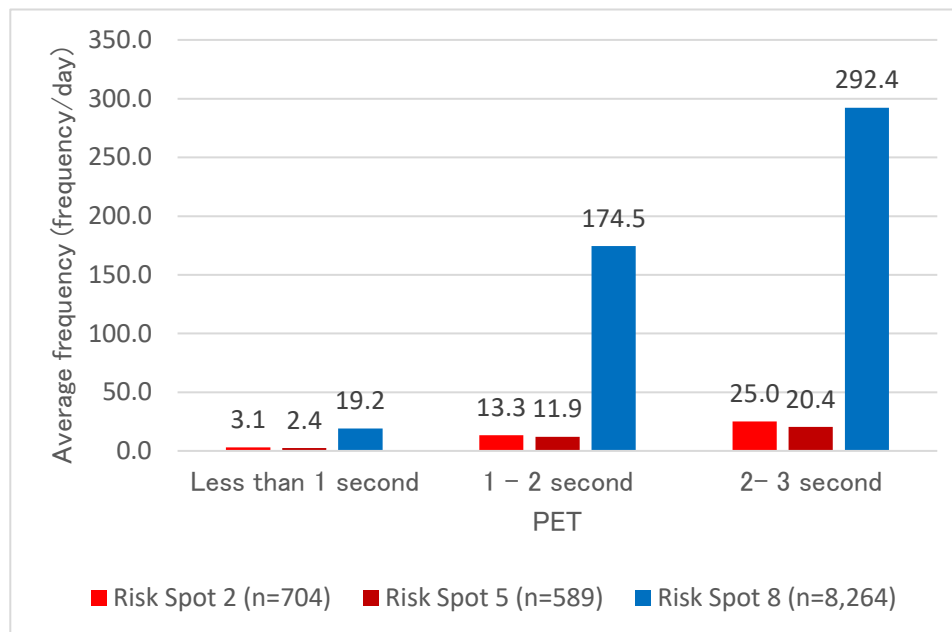
Source: JET

Figure 6.3.74 PET Evaluation Intersection

The results of the effectiveness evaluation of the countermeasures are shown in Figure 6.3.75. The graph shows the total frequency of PET less than 3 seconds, which is a high-risk PET for traffic accidents.

Installing traffic signals resulted in an average of 86% reduction in the number of PET in less than 1 second, which is a particularly high risk for traffic accidents. This is expected to significantly reduce the risk of traffic accidents.

On the other hand, it was expected that installing traffic signals would eliminate the occurrence of PET, especially those less than 1 second, but they still occur 2 to 3 times per day. A detailed video review presented that all these cases happen when ignoring the traffic signal, especially when a vehicle immediately enters the intersection after the lights change to red.

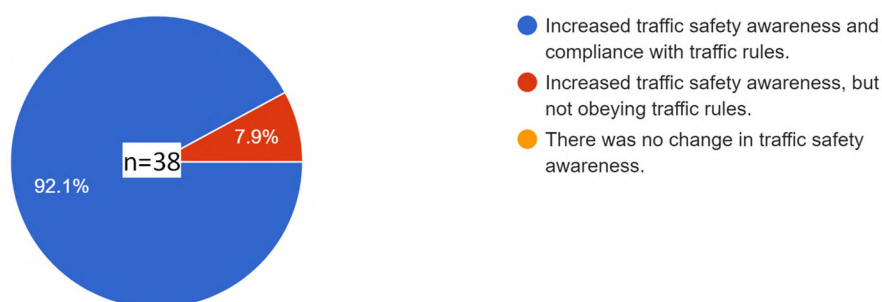


Source: DRR, JET

Figure 6.3.75 Evaluating the Effectiveness of Countermeasures

2) Awareness Change

A questionnaire survey was conducted for participants of the traffic safety campaign and the poster competition to evaluate awareness changes of traffic safety. As shown in next figure, the awareness of all participants on traffic safety awareness increased, with 92% indicating they became more compliant with traffic rules.



Source: JET

Figure 6.3.76 Questionnaire Survey Result of the Traffic Safety Campaign Participants

3) The number of Traffic Accidents

As shown in Table 6.3.33, there were 105 traffic accidents in four years on DRR roads in Suphan Buri, 26 of which (25% of the total number of traffic accidents) were traffic fatalities. The number of fatalities accidents and fatalities has been on a decreasing trend since 2021. The number of fatalities per fatal accident was 1.4.

Table 6.3.33 Traffic Accident Statistics for DRR Road in Suphan Buri

Year	No. of Traffic Accidents	No. of Fatalities Accidents	Percentage of fatal accidents	No. of Fatalities	Number of fatalities per fatal accident
2019	37	10	27%	14	1.4
2020	34	12	35%	15	1.3
2021	16	1	6%	2	2.0
2022	18	3	17%	5	1.7
Total	105	26	25%	36	1.4

Source: DRR, JET

In order to achieve a 30% reduction in traffic fatalities would require a reduction of 2.7 traffic fatalities per year. The following is a roadmap to achieve the 30% reduction.

Table 6.3.34 shows the results of a crosstabulation of traffic accidents in Suphan Buri by road structure and the cause of the accident. Traffic accidents at intersections account for 35% of the total traffic accidents.

Table 6.3.34 Results of Traffic Accident Data Analysis for Suphan Buri

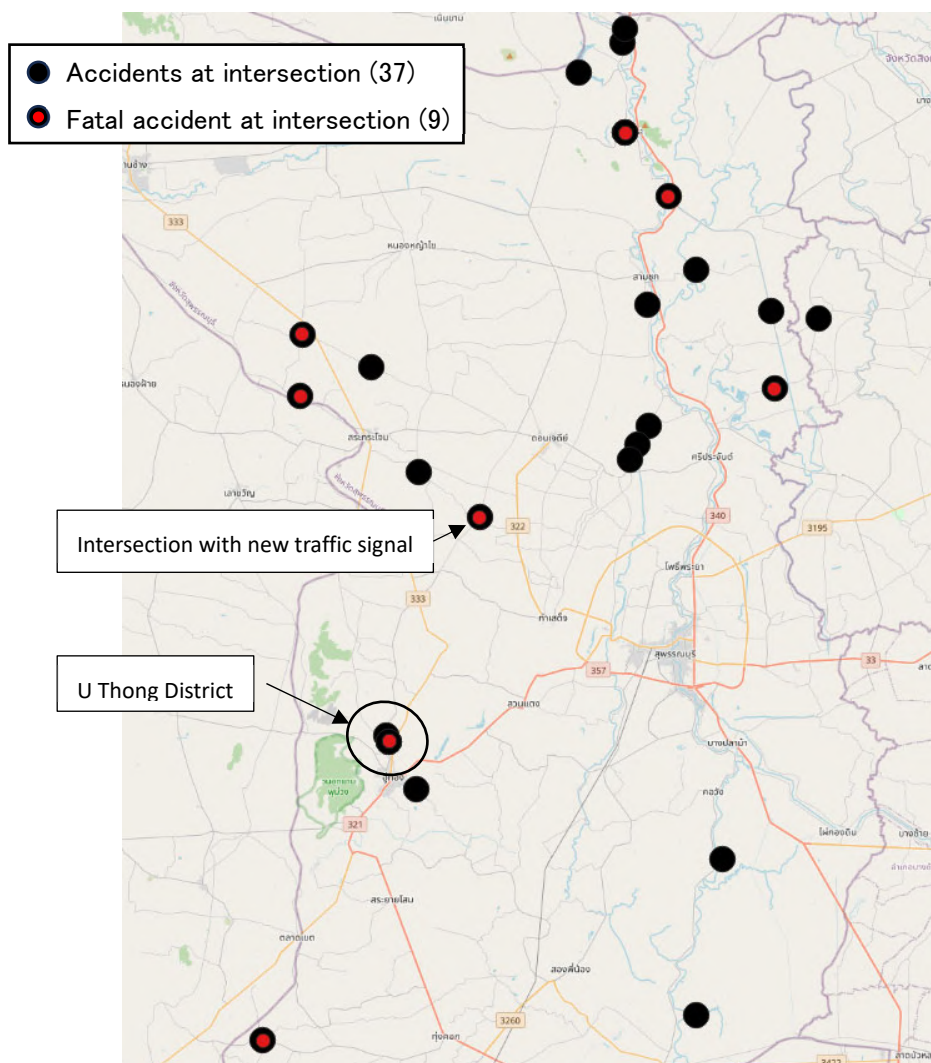
	Straight	Curve	Intersection	Sharp Curve	Others	Total
Over speed	17%	11%	8%	1%	0%	37%
Drunk	1%	3%	0%	0%	0%	4%
Rushing out	9%	1%	10%	0%	0%	19%
Doze off	3%	0%	1%	0%	0%	4%
Others	11%	5%	17%	1%	2%	36%
Total	41%	20%	35%	2%	2%	100%

Source: JET

The distribution of accidents at intersections in Suphan Buri (2019-2022) is shown in Figure 6.3.77. There were 9 fatal accidents at intersections. In particular, 2 fatal traffic accidents occurred at intersections in U Thong District, resulting in 3 fatalities and 6 injuries. Traffic signals have already been installed at this intersection as a pilot project.

In addition, a budget has been secured in FY2024 /2025 to convert the intersection to a signalized intersection at the intersection where the traffic fatalities occurred, which is located north of U Thong District.

As shown under "1) Behavioral Change," installing traffic signals improved PET significantly. In particular, the number of PETs with less than 1 second, which have a high risk of traffic accidents, has been reduced by 86%. A similar percentage of traffic fatalities can be expected to be eliminated. By implementing these countermeasures at the intersections where fatal accidents occur, as shown in Figure 6.3.77, a 30% reduction in traffic fatalities (= 35% of traffic fatalities at the intersection x 86% reduction in traffic accident risk) is expected.



Source: JET

Figure 6.3.77 Distribution of Accident at Intersection in Suphan Buri (2019–2022)

(3) The Third Year

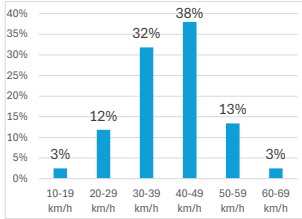
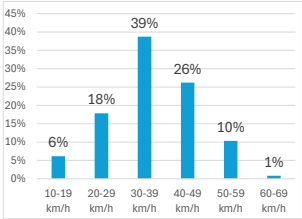
1) Behavior Change

An evaluation survey of the effectiveness of the countermeasures was conducted in the pilot area in Samut Sakhon. Differences in travel speeds before and after the pilot project were evaluated at the 3 km + 400 on Route 4008 in the pilot area.

Installing post cones in the median line, which was proposed in the pilot project, was canceled due to negative opinions from residents. However, those were temporarily installed and surveyed to evaluate the effectiveness of the countermeasure. It was confirmed that the countermeasures implemented in the pilot project reduced the average

travel speed by 9.4%, from 40.4 km/h to 36.6 km/h.

Table 6.3.35 Evaluating the Effectiveness of Countermeasures

	Before Pilot Project	After Pilot Project
		
Date	2023/10/05	2024/05/08
Average speed	40.4 km/h	36.6 km/h
Frequency distribution of speed zones		
No. of sample	n=2,640	n=2,154

Source: JET

As in the first year, a power model was used to estimate the reduction in traffic fatalities with lower speeds. For the exponent of the power model, the parameters for “all roads” were used because the subject roads are “rural” but also have “residential areas” nearby. Table 6.3.36 shows the results of the estimated reduction in fatal accidents and traffic fatalities. The results show an estimated reduction in fatal accidents and fatalities of about 30%.

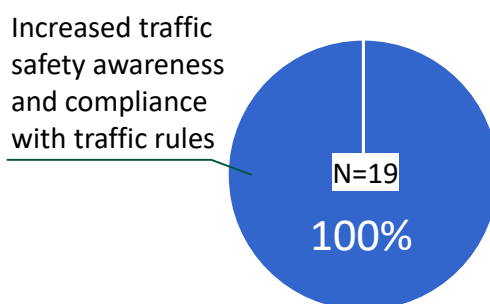
Table 6.3.36 Estimated Reduction in the Number of Fatal Accidents and Fatalities

	Decrease rate
Fatal accidents	29.2%
Fatalities	34.6%

Source: JET

2) Awareness Change

A questionnaire survey was conducted to confirm changes in safety awareness after the traffic safety campaign. As shown in Figure 6.3.78, all participants reported an increased awareness of traffic safety and adherence to traffic rules.



Source: JET

Figure 6.3.78 Questionnaire Survey Result of the Traffic Safety Campaign Participants

3) The number of Traffic Accidents

Ninety-two traffic accidents occurred on DRR roads in Samut Sakhon province over a four-year period, 14 of which (15% of the total number of traffic accidents) were traffic fatalities, as shown in Table 6.3.37. The number of traffic fatalities decreased in 2020 but then has remained down at about 4 fatalities/year. The average number of fatalities per fatal accident was 1.1.

Table 6.3.37 Traffic Accident Statistics for DRR Road in Nakhon Ratchasima

Year	No. of Traffic Accidents	No. of Fatalities Accidents	Percentage of fatal accidents	No. of Fatalities	Number of fatalities per fatal accident
2019	43	4	9%	6	1.5
2020	16	1	6%	1	1.0
2021	17	5	29%	5	1.0
2022	16	4	25%	4	1.0
Total	92	14	15%	16	1.1

Source: DRR

In order to achieve a 30% reduction in traffic fatalities would require a reduction of 1.2 traffic fatalities per year. The following is a roadmap for achieving a 30% reduction in traffic fatalities.

Table 6.3.38 shows the results of a crosstabulation of traffic accidents in Samut Sakhon by road structure and accident cause. Traffic accidents on straight sections accounted for 72% of all traffic accidents, while traffic accidents caused by overspeed accounted for 49%.

Table 6.3.38 Results of Traffic Accident Data Analysis for Samut Sakhon

	Straight	Curve	Intersection	Sharp Curve	Others	Total
Over speed	34%	10%	4%	0%	1%	49%
Drunk	13%	1%	3%	0%	0%	17%
Rushing out	11%	1%	2%	0%	0%	14%
Doze off	1%	0%	0%	0%	0%	1%
Others	13%	2%	2%	0%	1%	18%
Total	72%	14%	12%	0%	2%	100%

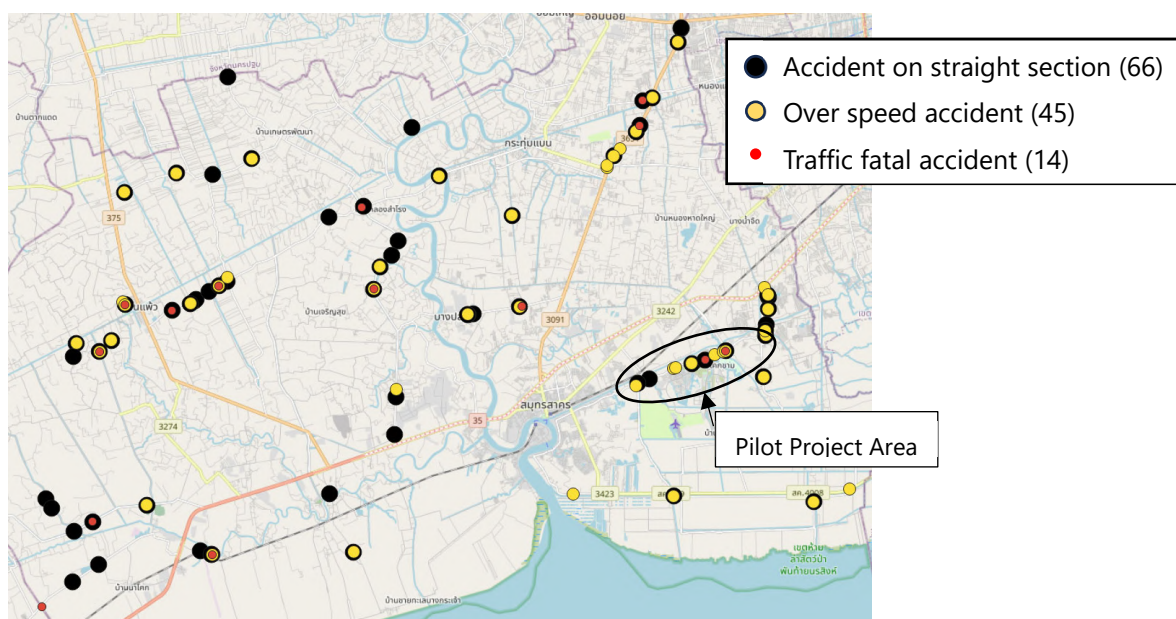
Source: JET

Figure 6.3.79 shows the distribution of traffic accidents due to overspeed at intersections in Samut Sakhon province (2019–2022). The number of fatal accidents on straight sections was 10 over 4 years. Additionally, there were 6 fatal overspeed accidents during these 4 years, all of which occurred on straight sections.

In particular, Route 4008 (Figure 6.3.80), where traffic accidents were concentrated and two traffic fatalities occurred, was selected as a pilot project area, and countermeasures were implemented. A budget for road improvement was secured for the eastern 3 km section of Route 4008 in fiscal years 2024/2025. During the workshop, residents raised their concerns about the risk of traffic accidents in the eastern section of Route 4008, and discussions were held with the road administrator. It is necessary to continue the resident-participatory traffic safety activities implemented in this project on Route 4008 and expand them to other accident-prone sections of the road.

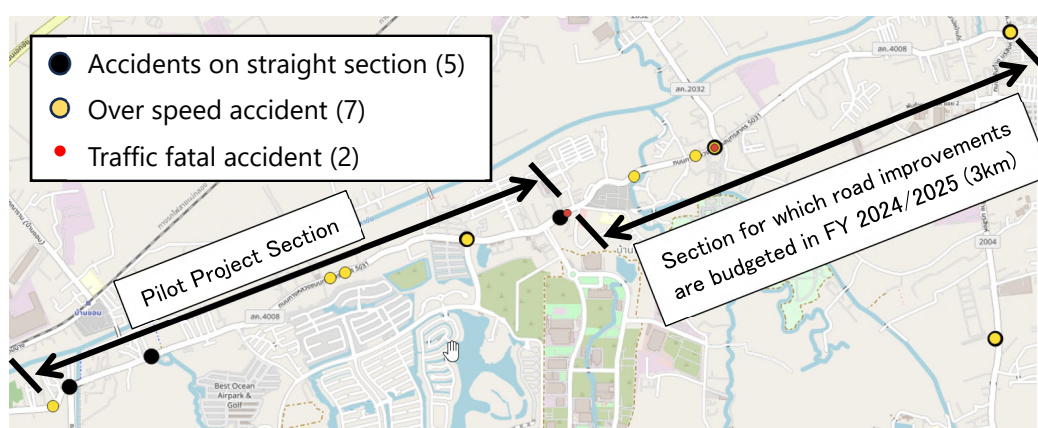
As shown in the above “1) Behavior Change,” installing color pavement and post cones and revising the speed limit were found to be effective in reducing travel speed. It was estimated that this would reduce the number of traffic fatal accident by 29.2%.

By implementing these countermeasures on the straight sections and at the locations of fatal overspeed accidents shown Figure 6.3.79, the number of traffic fatalities will be reduced by 2.9 (= 10 fatal accidents on straight section x 29.2% reduction in traffic fatalities) and the number of traffic fatalities will be reduced by 3.2 (= 2.9 traffic fatalities reduced x 1 fatality per fatal accident). This is expected to result in 20% reduction in the number of traffic fatalities (=3.2 reduction in traffic fatalities / 16 fatalities).



Source: JET

Figure 6.3.79 Distribution of Over Speed and Accidents at Intersection in Samut Sakhon (2019-2022)



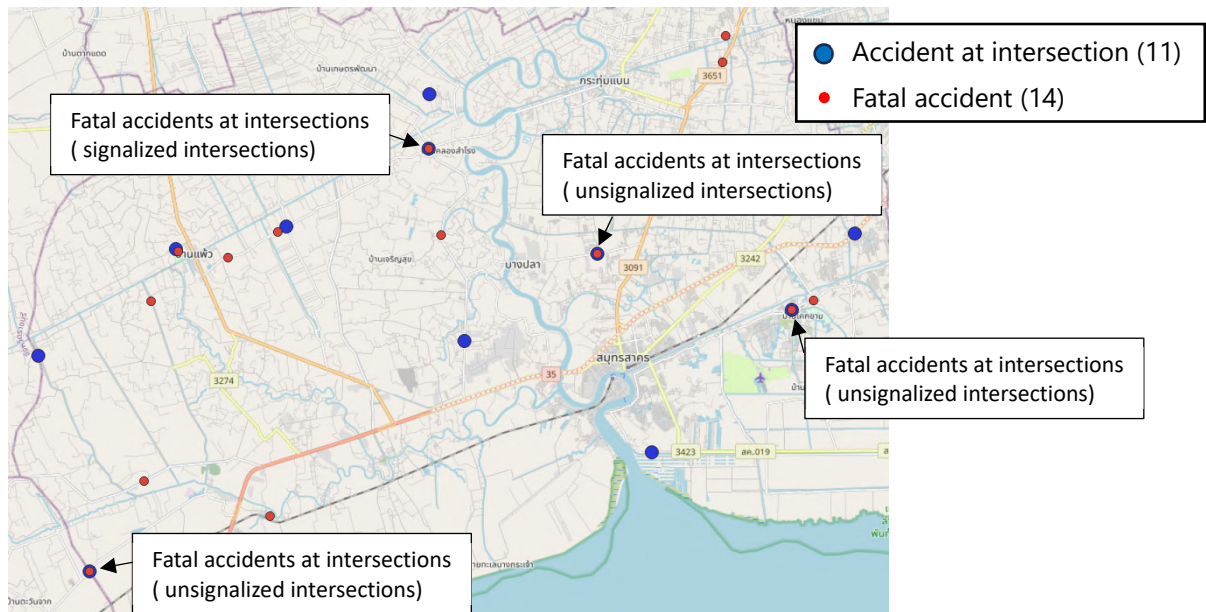
Source: JET

Figure 6.3.80 Distribution of Traffic Accidents in Pilot Project Area (2019-2022)

An additional 10% reduction in traffic fatalities is required to achieve the 30% reduction goal. Four traffic fatal accidents at intersections occurred over 4 years. Three of those intersections are without traffic signals. Therefore, similar to the countermeasures implemented in Suphan Buri Province as a pilot project, traffic accidents within the intersection can be reduced by installing traffic signals and controlling the traffic flow. A reduction of 2.6 traffic fatalities (= 3 fatalities at unsignalized intersections x 86% reduction in traffic accident risk) will further reduce to 2.8 traffic fatalities (= 2.6 traffic fatalities

reduced x 1.1 fatalities per fatal accident). This is expected to result in an 18% reduction in traffic fatalities (= 2.8 reduction in the number of traffic fatalities / 16 fatalities).

As a result, a 38% reduction in traffic fatalities can be expected from the installation of signalized intersections (18% reduction), in addition to speed reductions on straight sections (20% reduction).



Source: JET

Figure 6.3.81 Distribution of Traffic Accidents at Intersection in Samut Sakhon (2019-2022)

6.4 List of Technical Document

The following technical document was created during the activities of the Output 3.

Table 6.4.1 List of Technical Document

No	Title	Reference No.
1	Comprehensive Traffic Safety Program Implementation Manual	TD3-1

7 Land Transport Administration for Road Safety on Driver Licensing and Operation Management for Commercial Vehicle is Improved (Output 4)

7.1 Outline

Output 4 comprises six activities in the PDM, and its objective verifiable indicators are set as shown below.

Table 7.1.1 Effectiveness Indicators for Output 4

4-1 The improved licensing system is approved by the MOT.
4-2 Three inspections for safety operation management to commercial vehicle operators including medium and small operators are implemented.

7.2 Record of Meetings

WG4 was divided into two activities: the driving licensing system and the transport safety manager (TSM) system for commercial vehicles, with different departments in charge within DLT. Therefore, two groups were assigned for each activity: "WG4 (Driver Licensing System)" and "WG4 (Operation Management)."

The WG4 (Driving Licensing System), chaired by DLT, regularly holds meetings. It also consults with the Land Transport Safety Bureau (LTSB) and external organizations as needed to improve the driving license system and the motorcycle safe driving training course for high school students. There was also a meeting with the head of the LTSB to discuss the activity policy and schedule of WG4 (Driving Licensing System). Furthermore, seminars were held for capacity development for DLT headquarters and regional office staff.

The results of discussions with each agency are shown in Table 7.2.1, and Table 7.2.2 shows the details from the seminars.

Table 7.2.1 Record of Meetings (WG4 [Driving Licensing System])

Date	Meeting / Organization	Content
2021		
27 January	1 st WG (Jointly by WG1,2,3,4)	· Explanation of each WG's implementation and schedule. · Confirmation of each WG Chair. · Confirmation of the date of the next WG meeting.

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5 March	2 nd WG4	- Confirmation of WG4 activity outline. - Introduction to the overview of driving license and operation management in Thailand. - Introduction to the overview of driving license and operation management in Japan. - Confirmation of upcoming activities.
8 March	Meeting with DLT	- Brief description of this project. - Explanation and discussion of the pilot province selection method.
6 May	Thai Automotive Industry Association (TAIA)	- Introduction to TAIA. - Description of this project. - Cooperation in future activities.
21 May	3 rd WG4	- Creation of an Action Plan for Licensing and Operations Management (JET). - Current issues related to licensing and operations management (DLT). - Future WG4 progress and schedule (JET).
14 June	TSOC (WG4)	- Meeting with TSOC (WG4) members. - Confirmation of WG4 activity outline.
26 June	DLT-LTSB	Discussion of considerations for creating an Action Plan.
12 July	WG4 (DLT) Administrative Consultation	Meeting with TSOC advisors to exchange views on activities in WG4 (Driving Licensing System).
15 July	WG4 (DLT) Administrative Consultation	Explanation of activities in the field of driving license to TSOC's WG4 members.
21 July	WG4 (DLT) Administrative Consultation	Discussions with TSOC Advisor and LTSB Director on activities in WG4 (Driving Licensing System).
23 August	Discussion with Honda Motor Co.	- Explanation of Honda's Safety Goals and Results of Accident Investigation in Thailand. - Description of this project. - Cooperation in this project.
9 September	Discussion with Honda Motor Co.	- Honda's safety training and instructor training content. - Traffic safety activities by dealers. - Age of obtaining a driving license.
4 November	LTSB	Activities for Outcome 4 (Driving Licensing System) and materials provided.
11 November	LTSB	Public relations-related activities and requests for collection of materials.
12 November	LTSB	Request for activities and collection of materials related to the driver licensing system and driver education.
16 November	LTSB	Public relations-related activities and requests for collecting materials.
22 November	DLT Bangkok No. 3 License Center (on the premises of DLT main office)	Site visit to confirm the driving license examination and issuance or driving license renewal and other operations.
	LTSB	Meeting with section managers regarding general activities, direction, and JCC.
24 November	DLT directly operated	Site visit to check the activities of directly operated

	driving school (on DLT's main campus)	driving schools.
2 December	Thai Honda Bangkok Safe Driving Center	• Site visit to confirm the status of driving license training and motorcycle safe driving training at private driving schools (ALAKSH, Vice President of Honda Thailand was present).
3 December	TSL Driving School (Don Mueang)	• Site visit to check the status of driving license training and motorcycle safe driving training at private driving schools.
13 December	Ramlukka Driving School directly managed by DLT	• Site visit to check on the activities of directly managed driving schools from the driver licensing system in Output 4.
14 December	Thai Motorcycle Enterprise Association (TMEA)	• Meeting at DLT regarding safe driving education and preparation of driving training materials (ALAKSH TMEA Chairman (Vice President of Thai Honda) in attendance.
15 December	LTSB	• Meeting on driving license system and preparation of driver training materials.
17 December	LTSB	• Discussion on future activities regarding the promotion of driving licenses.
2022		
8 February	LTSB	• Discussions with the director about the direction of future activities.
18 February	LTSB	• Exchange of opinions on motorcycle safe driving training for high school students.
22 February	LTSB	• Meeting regarding the site visit of the safe driving course site for high school students.
26 February	DLT BKK Area 2 Office (Taling Chan)	• Site visit of a safe driving course site for high school students and observation of its implementation.
3–4 March	DLT District Office and Chum Puan Secondary School, Phimai District, Nakhon Ratchasima Province	• Site visit of a safe driving course site for high school students and observation of its implementation.
7–8 March	DLT Provincial Office and Ratcha Bolikha Secondary School, Ratcha Buri, Ratcha Buri Province	• Site visit to a safe driving course site for high school students and observation of its implementation.
9 March	LTSB	• Report presentation and discussions on the results of the visit to the safe driving course site for high school students.
15 March	DLT DDG	• DDG in charge of LTSB arrival address
16 March	LTSB	• Discussion on improving motorcycle safe driving training for high school students.
18 March	LTSB	• Discussion on improving motorcycle safe driving training for high school students.
19 March	LTSB	• Discussion with the direction about improving motorcycle safe driving training for high school students and overall activities.
29 March	Thai Motorcycle Enterprise	• Approached the company about the possibility of

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	Association (TMEA)	cooperating in improving the motorcycle safe driving training for high school students.
1 April	LTSB	• Discussion on improving motorcycle safe driving training for high school students.
5 April	LTSB, TMEA	• Discussion on improving motorcycle safe driving training for high school students.
7 April	LTSB	• Discussion with the Director on improving motorcycle safe driving training for high school students.
11 April	LTSB	• Discussion with the Director on improving motorcycle safe driving training for high school students.
22 April	LTSB	• Meeting on driving license system.
23 May	LTSB	• Discussion with the section managers on how to proceed with the activity.
	LTSB	• Discussions with the section managers about how to proceed with the activity.
30 May	LTSB	• Discussion with the Director on improving motorcycle safe driving training for high school students.
	LTSB	• Meeting with Director regarding improvement of motorcycle safe driving training for high school students.
2 June	LTSB	• Meeting on driving license system.
8 June	LTSB	• Discussion on improving motorcycle safe driving training for high school students.
13 June	LTSB	• Meeting on driving license system.
16 June	LTSB	• Discussions with the section managers about how to proceed with the activity.
17 June	TMEA	• Discussion on improving the motorcycle safe driving training for high school students.
20 June	LTSB	• Discussion with AIT Dr. Kunnawee Kanitpong, who is contracted by the LTSB for various tasks.
29 June	LTSB	• Discussion with the section managers on how to proceed with the activity.
1 July	LTSB	• Discussion on improving motorcycle safe driving training for high school students.
	LTSB	• Discussions with the section managers about how to proceed with the activity.
6 December	LTSB	• Discussions with the section managers about how to proceed with the activity.
2023		
6 January	LTSB	• Discussions with section managers on how to proceed with the activity.
9 January	LTSB, TMEA/TAIA	• Working-level discussions with TMEA/TAIA on the contents of the WG activities and the safe driving course for high school students for the first WG meeting.
2 February	LTSB	• Discussion on the safe driving course for high school students WG.

6 February	LTSB	• Division Director's discussion on improving the driver licensing system.
13 February	LTSB	• Discussions on the safe driving course for high school students.
10 March	LTSB	• Discussion with the section heads regarding the WG on motorcycle safe driving training for high school students.
20 March	LTSB	• Director's discussion on project evaluation.
21 March	LTSB, TSOC	• TSOC consultation on project evaluation.
7 April	LTSB	• Discussion with the section managers on how to proceed with the activity.
10 April	Bangkok Northern Bus Terminal	• Observation of the Songkran traffic safety event organized by DLT at the Bangkok Northern Bus Terminal.
21 April	LTSB	• Hearing to D. Driving School (a major driving school) related to improving the driving license system.
24 April	DLT Bangkok No. 3 License Center (on the premises of DLT main office)	• Improvement of the driving license system • Site visit of video training for license renewals.
25 April	LTSB	• Discussion on safe driving course for high school students WG.
8 May	LTSB	• Discussion on safe driving course for high school students WG.
12 May	LTSB	• Discussions with section managers on how to proceed with the activity.
23 May	Thai Honda Bangkok Safe Driving Center	• Collaboration with DLT on the traffic safety area of Honda Thailand.
25 May	LTSB	• Discussion on the safe driving course for high school students WG.
	LTSB	• Discussions with the director about how to proceed with activities toward the end of the project.
13 June	LTSB	• Discussions with section managers about how to proceed with the activity.
16 June	LTSB	• Discussion on safe driving course for high school students WG.
22 June	LTSB	• Discussions with section managers on how to proceed with the activity.
23 June	LTSB	• Discussion on improving the driving license system
13 July	LTSB	• Discussions with section managers about how to proceed with the activity.
21 July	LTSB	• Director's discussion on project evaluation.
26 July	LTSB	• Discussion with section managers on improving the driving license system.
11 August	LTSB	• Discussions with the section managers about how to proceed with the activity.
25 September	LTSB	• Discussions on project evaluation.
	LTSB	• Discussions on project evaluation.
4 October	LTSB	• Discussions with the director on the first seminar and other works in progress.

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11 October	LTSB	• Discussions with the director on the first seminar and other works in progress.
20 October	LTSB	• Discussions with the director on the first seminar and other works in progress.
25 October	LTSB	• Discussions with the director on the first seminar.
8 November	LTSB	• Discussions with the director on the first seminar.
10 November	LTSB	• The day of the first seminar.
22 November	LTSB	• Discussions with the director on the project evaluation.
24 November	LTSB, TSOC	• TSOC consultation on project evaluation.
28 December	LTSB, TSOC	• Meeting on project evaluation and seminar implementation at DLT executive meeting.
2024		
10 January	LTSB	• Meeting to discuss pilot project implementation.
11 January	LTSB	• Meeting to discuss pilot project implementation.
17 January	Baan Beu Vocational Training School, Samut Sakhon Province	• Meeting on implementing the pilot project at Baan Bae U Vocational Training School, Samut Sakhon Province.
19 January	LTSB	• Meeting on seminar implementation and pilot project implementation at DLT executive meeting.
22 January	Baan Beu Vocational Training School, Samut Sakhon Province	• Implementation of the pilot project at Baan Beu Vocational Training School, Samut Sakhon Province.
24 January	Baan Beu Vocational Training School, Samut Sakhon Province	• Implementation of the pilot project at Baan Beu Vocational Training School, Samut Sakhon Province.
26 January	LTSB	• The day of the second seminar.
9 February	Bamburama High School, Suphan Buri Province	• Implementation of the pilot project at Bamburama High School, Suphan Buri Province.
15 February	Miracle Grand Convention Hotel	• Lecture on the history of traffic safety and the driving license system in Japan at the DLT executive meeting.
16 February	Bamburama High School, Suphan Buri Province	• Implementation of the pilot project at Bamburama High School, Suphan Buri Province.
21 February	LTSB	• Discussion with the director about the status of the implementation of the pilot project, the 2nd training in Japan, and future seminars.
1 March	LTSB	• The day of the 3rd seminar.
29 March	LTSB	• Discussion with the director about the data collection status of the pilot project, the 2nd training in Japan, and future seminars.
30 April	LTSB	• Discussions with the director about the 2nd training in Japan and future seminars.
2 May	LTSB	• The day of the 4th seminar.
14 May	LTSB	• Discussions with the director about the data collection status of the pilot project, the 2nd training in Japan, and future seminars.
18 May	2 nd training in Japan	• Conversations with Thai people living in Japan about their opinion on the driving status in Japan and Thailand with the participants during the 2nd

		training in TIC.
10 June	LTSB	Discussions with the director about the results of the 2nd training in Japan, the final report, the final JCC meeting, and future seminars.
21 June	LTSB	Discussions with the director about the final report, final JCC meeting, and future seminars.

Source: JET

Table 7.2.2 Program of the Driving License Seminars (2023–2024)

No.	Themes	Date	Hours
1	Issues of Traffic Safety in Thailand and Traffic Safety Administration in Japan	10 November	2.0
2	Driving License Education in Japan and Hazardous Prediction	26 January	3.0
	Findings of Training (November) in Japan		
3	Designated driving schools, training instructors and skill examiners in Japan	1 March	2.0
	Practice of driving license acquisition in Thailand with my experiences		
4	Reality of traffic accidents in Japan	2 May	2.0
	Various training programs for license holders in Japan		
5	Motorcycle safe driving training programs in Japan	13 June	2.0
	School Bus System in Japan		
	Findings of Training (May) in Japan		

The WG4 (TSM), chaired by DLT, regularly holds meetings. There were also weekly meetings with TSOC staff to enhance capacity and with relevant organizations to improve the transport operation manager system. Furthermore, the meetings with the LTSB director were for consultation on the direction of the activities and the technical working group for the capacity enhancement of DLT officers. The results of discussions with each agency are in Table 7.2.3.

Table 7.2.3 Record of Meetings (WG4 Transport Safety Manager)

Date	Meeting / Organization	Content
2021		
27 January	1 st WG (Joint of WG1, WG2, WG3, and WG4)	- Explanation of the implementation details and schedule of each WG - Confirmation of each WG chairperson - Confirmation of the schedule of the next WG
5 March	2 nd WG4	- Confirmation of WG4 Activity Summary - An overview of driving license and operation management in Thailand

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		· Overview of driving license and operation management in Japan · Confirmation of future activities
8 March	Meeting with DLT	· Outline of the project · Explanation and consultation on the selection method of the pilot prefecture
15 June	1 st WG4- Specific Study Group (SSG)	· Introduction to Transportation Safety Management in Japan (PDCA Plan) · Confirmation of the implementation policy of operation management activities
26 June	1 st WG4-SSG (DLT)	· Discussion of considerations for creating an action plan
8 July	WG4-SSG(OM)	· Confirmation of operations related to operation management in the following organizations within the DLT-LTSB · Freight Transport Bureau (FTB)
5 October	WG4-SSG(OM)	· Meeting with DLT-Passenger Transport Bureau (PTB) · Confirmation of PTB's organizational structure, work content related to operation management, and issues
15 October	WG4- Coordinating	· Meeting with LTSB-Director and Mr. Sujin · TSOC-WG1 members were identified for their involvement in analyzing commercial vehicle accident data.
18 October	WG4 SSG (OM)	· Meeting with DLT- LTSB, PTB, and FTB · It was confirmed that not only the LTSB but also the PTB and FTB will participate in this project. It was decided to issue an official letter from MOT.
25 October	WG4- Coordinating	· Meeting with DLT- Land Transport Safety Bureau-Director (LTSB) · Confirmation of work with the Safety Planning Group and the Safety Promotion Group for the preparation of the Action Plan
28 October	WG4-Technical	· LTSB - Safety Planning Group, Meeting with Safety Promotion Group · Confirmation of the division of work in organizing basic information necessary for operation management activities in preparation of an action plan
4 November	DLT - FTB	· Cooperation in this project · Confirmation of FTB's organizational structure and operation management operations
10 November	DLT - PTB	· Cooperation in this project · Confirmation of PTB's organizational structure and operation management operations
11 November	DLT - LTSB	· Confirm the progress of upcoming activities of Output 4 (TSM) · Action Plan and JCC material
12 November	WG4-Technical Meeting	· Analysis of the situation of Output 4 (TSM)

	(LTSB)	
2022		
8 April	WG4 Meeting	Exchange of opinions on the progress of activities related to driving license and operation management and future plans.
11 April	WG4 (LTSB Planning Group)	Consideration of action policies for improving B-TAIMS and improving accident data analysis capabilities
21 April	WG4 (DLT_GPSC)	Study of measures to utilize GPS data in operation management
22 April	WG4 (DLT_FTB & PTB)	Consultation on model operators to cooperate with TSM pilot activities
17 May	DLT Passenger Transport Bureau (PTB)	Consultation on model operators (buses) to cooperate in TSM pilot activities
18 May	DLT Land Transport Safety Bureau (LTSB)	Confirmation of work progress and future activity policy related to Output 4 (TSM)
19 May	DLT Freight Transport Bureau (FTB)	Consultation on model operators (buses) to cooperate in TSM pilot activities
24 May	Thanatwit Travel Group Company Limited (Bus)	- Request for cooperation in TSM pilot activities. - Visit sales offices.
26 May	Italian-Thai Development Public Company Limited (Bus and Truck)	- Request for cooperation in TSM pilot activities. - Visit sales offices.
27 May	Global Progress Transport Company Limited (Truck)	Request for cooperation in TSM Pilot activities.
30 May	J&J Logistics System Company Limited (Truck)	- Request for cooperation in TSM pilot activities. - Visit sales offices.
23 September	LTSB/FTB/PTB	- Confirmation of the work progress and future activity policy related to Output 4 (TSM) - Consultation on how to proceed with the TSM pilot
26 September	Director of LTSB	- Report on TSM Pilot Activity Policy - TSM registration system promoted by DLT
29 September	LTSB-Planning Group	Implementation of training on traffic accident analysis using B-TAIMS
	LTSB-TSM Promotion Group	Confirmation of the development plan for the TSM registration system
4 November	LTSB-Planning Group	Implementation of training on traffic accident analysis using B-TAIMS
14 December	Director of LTSB	- Confirmation of the progress of operation management activities and future plans - Review PCG meeting materials
15 December	Motor Vehicle Bureau, Ministry of Land, Infrastructure, Transport and Tourism	Overview of Japan's operation manager system and audits
22 December	Tokyo Airport Transportation	Exchange of opinions and on-site inspections regarding safety management activities under the operation manager system
2023		

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11 January	1 st Monthly Meeting	• Confirmation of the progress of each WG's activities • Confirmation of the preparation schedule for training in Japan
12 January	1 st Policy Discussion	• Confirmation of WG4-TSM activities and schedule • Confirmation of the 1st TSM workshop program and participants
13 February	TTK Asia Transport (Thailand) Company limited	• Consultation on the 1st TSM Workshop
13 February	MOT-Dr. Chakree	• Confirmation of activity content and schedule of Output 4 (TSM) • Consultation on the need for accident data analysis of commercial vehicles
14 February	J&J Logistics System Company Limited	• Consultation on the 1st TSM Workshop
15 February	Thanatwit Travel Group Company Limited	• Consultation on the 1st TSM Workshop
16 February	Yazaki Thai Office	• Discussion on the possibility of utilizing ICT equipment in operation management
17 February	Director of LTSB	• Confirmation of work progress and future activity policy related to Output 4 (TSM) • TSM Workshop Confirmation
22 February	1 st TSM Workshop	• Introduction of Japan's operation manager system • Discussion on the Implementation of the TSM System in Thailand
24 February	LTSB/ITC/GPSC	• Adding Business Information to B-TAIMS
25 April	WG4-TSM-Policy Discussion (Internal)	• Discussion among Prof. Fukuda, Dr. Tuenjai, and Mr. Ohno about the schedule of WG4 (TSM) activities, the schedule, and the program proposal for the 2nd TSM workshop.
2 May	WG4-TSM-Policy Discussion (Internal)	• Discussions with the LTSB Director and Deputy Director on the proposed schedule and program for the 2nd TSM Workshop
16 May	WG4-TSM-Policy Discussion (Internal)	• Discussion among Prof. Fukuda, Dr. Tuenjai, Dr. Varameth, and Mr. Ohno about the schedule and program of the 2nd TSM Workshop, and the TSM Manual.
1 June	WG4 (TSM) Internal meeting	• TSM-Policy Discussion (Prof. Fukuda, Dr. Varameth, Dr.Tuenjai) • Review of the 2nd TSM Workshop • Review the TSM Operation Manual
20 June	WG4 (TSM) DLT	• TSM-Policy Discussion (Mr. Titipat, Ms. Wilawon, Prof. Fukuda, Dr. Varameth, Dr.Tuenjai) • Confirmation of postponing the 2nd TSM Workshop • Confirmation of future work plan
21 June	WG4 (TSM) DLT	• Confirmation of the future work with DLT-Mr. Titipat and Ms. Wilawon • Confirmation of postponing the 2nd TSM Workshop and prioritizing the preparation of the

		TSM manual.
22 June	WG4 (TSM) Internal meeting	Discussion with Dr. Varemeth the contents of the TSM Operation Manual and what needs to be improved
28 June	WG4 (TSM) DLT	Discussion of the structure, content, and work schedule of the TSM manual with DLT practitioners
3 July	WG4 (TSM) Internal meeting	Discussion with Dr. Varemeth the contents of the TSM Operation Manual and what needs to be improved
5 July	WG4 (TSM) DLT	Discussion with DLT-LTSB (Mr. Titipat) about TSM Manual Structure, Content, and Work Schedule
6 July	WG4 (TSM) TTK, DTC, DLT	Discussion among TTK (Japanese truck operator), DTC (GPS provider), and DLT staff about the possibility of collaboration between DLT and private companies in operation management.
28 August	WG4 (TSM) DLT	Discussion with DLT-LTSB (Mr. Titipat) about TSM Manual Structure, Content, and Work Schedule
31 August	WG4 (TSM) DLT	- Expound the TSM manuals to DLT-LTSB, FTB, and PTB. - Confirmation from the model operator about the kick-off meeting.
5 September	WG4 (TSM) DLT	Consultation with DLT-LTSB for a kick-off meeting with model operators.
8 September	Kick-off meeting with model operators	- Instruction of the TSM Operation Manual - Explanation of the TSM pilot project. - Questionnaire surveys and requests for the provision of various data.
5 October	WG4-TSM Online meeting with Model Operators	- Checking the progress of TSM pilot activities - Confirmation of opinions on the TSM manuals, etc.
17 October	WG4-TSM Online meeting with J&J (truck company)	- Checking the progress of TSM pilot activities - Confirmation of opinions on the TSM manuals, etc.
22 November	WG4 (TSM) DLT	- Confirmation of the progress and schedule of WG4 (TSM) activities - Consultation on video recording at truck and bus operators - Discussions for the 2nd TSM Pilot Project
23 November	Trucking company (J&J)	- Video recording of TSM operations and meetings with business operators. - Filming of a vehicle inspection and a roll call.
28 November 2023	WG4 (TSM) DLT-ITC	Discussion on the use of GPS data with the department that manages GPS data (ITC)
29 November	Bus operator (Thanatwit)	- Video recording of TSM operations and meetings with business operators - Filming of a vehicle inspection and a roll call.
30 November	Model Operators & DLT	Meeting with model operators for the 2nd TSM pilot project
1 December	WG4 (TSM)	Confirmation of activity policy for accident data analysis of commercial vehicles
2024		

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28 February	WG4 (TSM)	• Data collection from ITC • Questionnaire Answer collection from Model operators • Preparation of TSM online meeting
6 March	Director of LTSB	• Confirmation of the activity progress and schedule
7 March	YAZAKI THAILAND	• Discussion on the use of GPS data for operation management
8 March	LTSB-Promotion Group	• Confirmation of the activity progress and schedule
11 March	DLT-ITC Department	• Confirmation of GPS data to use for evaluation
27 March	Online meeting with Transport Safety Managers	• Announcement of the completion of the TSM Operation Guideline

Source: JET

7.3 Activities

7.3.1 Improvement of the Licensing System including Examination, Education and Training Programs for Motorcycle

(1) Positioning of DLT

The DLT of the MOT, established in 1933, is primarily responsible for the land transport administration in Thailand. The Establishment Decree stipulates the following objectives of the DLT.

DLT has the following powers and duties supervising, inspecting, regulating, and planning the land transportation system to other transportation systems to make the former more flexible, convenient, expeditious, and safe.

- (i) Operate land transportation systems in accordance with the Land Transportation Law, the Vehicle Law, and other relevant laws.
- (ii) Take measures to improve land transportation systems, prevent accidents, and ensure safety.
- (iii) Promote the development of land transportation networks.
- (iv) Enforce systems and regulations related to land transportation.
- (v) To cooperate and coordinate with relevant domestic and foreign agencies and organizations in relation to international conventions and agreements on land transportation.
- (vi) Perform such other powers and duties within the ministry as prescribed by law and required by the Cabinet.

The following departments were established in DLT to achieve the objectives of the DLT Establishment Decree. (Capacity: 4,069)

- Director General and Deputy Director Generals
- Management, Planning, Finance, Audit, Legal and other departments
- Passenger Transportation Bureau (PTB)
- Freight Transportation Bureau (FTB)
- Vehicle Registration and Vehicle Tax Collection Bureau
- Automotive Engineering Bureau
- Land Transport Safety Bureau (LTSB)
- Bangkok Transport Office (5 locations)
- IT Technology Center
- Regional offices (76 locations)

The duties of the LTSB are defined as follows:

- (i) Study, develop, and plan systems to prevent accidents and promote traffic safety in land transportation.
- (ii) Establish standards, rules, and regulations on supervising driving licenses and motor vehicle operators and advise on driving.
- (iii) Prescribe standards, rules, and supervision and advise on training programs of DLT-operated traffic schools and DLT-designated driving schools.
- (iv) Operate a traffic school directly managed by DLT.
- (v) Cooperate with related organizations or provide operational support with respect to the matters described in items (i) through (iv).

Based on the above, activities 4.1 through 4.4, related to the driving license from Outcome 4 of this Project, are within LTSB's jurisdiction.

(2) Outline of driving license System

Driving license in Thailand began in 1930, and the vehicle registration and driving license system was established in 1954. At that time, the DLT was responsible for vehicle registration, while the Ministry of Police and Interior was responsible for the driving license system. In 1988, the DLT took over the driving license system, which became the basis of the current system. The driving license system is regulated by the Road Traffic Acts (1979), the Motor Vehicle Act (1979), and the Land Transport Act (1979). The Vehicle Act covers vehicles with displacements of 2,200 cc or less, while the Land Transport Act covers above 2,200 cc. Table 7.3.1 shows the categories of driving licenses and the number of licenses issued under the Vehicle Act and the Land Transport Act, respectively.

Note that under the Thai licensing system, different licenses are issued for different license categories. In other words, a person with a motorcycle and a four-wheeled vehicle license would have two driving licenses. Being separate licenses, they are counted as two. In the table below, the total number of licenses issued is not necessarily the number of persons with driving licenses. The total number of driving license holders, however, is unknown, as no name collation of license holders was conducted among the different license categories.

Since 2023, the demerit point system for traffic offenders has been implemented, applying demerits to license holders with violations. On the other hand, discussions on consolidating or unifying issued and newly issued driving licenses have not been

conducted at this time. (A drastic reform of the driving license system, such as the consolidation of driving licenses by name and the unification of driving licenses, would significantly impact the license holders under the lifetime driving license system that was in place until 2004.)

In addition, the license inspector, fare collector, and bus hostess in the table are counted in the number of issued licenses, although they are not driving licenses.

Table 7.3.1 Number of Issued Driving Licenses by Classification (as of 31 October 2021)

#	Driving license classification	age limit	number
I. Vehicle Law			Total 30,622,635
1	Provisional 4-wheel vehicle driving license	18	1,104,899
2	Provisional Tricycle driving license	18	239
3	Provisional motorcycle driving license	15	696,390
4	1 Year-4-wheel vehicle driving license	-	-
5	1 Year-Tricycle driving license	-	-
6	1 Year-Motorcycle driving license	-	-
7	4-wheel vehicle driving license	(19)	10,285,595
8	Tricycle driving license	(19)	6,902
9	Motorcycle driving license	(16)	6,110,052
10	Life time 4-wheel vehicle driving license	No new issues	6,164,310
11	Life time Tricycle driving license	No new issues	4,806
12	Life time Motorcycle driving license	No new issues	5,951,734
13	Public 4-wheel vehicle driving license	(19)	94,656
14	Public Tricycle driving license	(19)	7,048
15	Public Motorcycle driving license	(16)	160,163
16	International driving license		19,873
16-1	- International driving license 1949	No new issues	14,390
16-2	- International driving license 1968	(23, 20)	5,483
17	Road roller driving license	18	270
18	Tractor driving license	18	6,553
19	Farm Vehicle Driving License	18	8,665
20	Other driving license	18	480
II. Land Transportation Law			Total 1,714,354
1	Private vehicle drivers		599,791
1-1	Truck & Bus (Class I)	22	1,651
1-2	Truck & Bus (Class II)	22	495,078
1-3	Truck & Bus (Class III)	22	95,501
1-4	Truck & Bus (Class IV)	25	7,561
2	All-type vehicle drivers		1,100,887
2-1	Truck & Bus (Class I)	18	15,744
2-2	Truck & Bus (Class II)	20	726,499
2-3	Truck & Bus (Class III)	20	235,324
2-4	Truck & Bus (Class IV)	25	123,320
3	License Inspector		447
4	Fare Collector		10,902
5	Bus Hostess		2,327

Source: DLT

(3) Summary of Driving license Examination

Obtaining a driving license in Thailand has two stages: a provisional license valid for two years and a full license obtained after renewing the provisional license. However, there are no restrictions on driving after obtaining a provisional license, and the only difference between a provisional license and a full license is the validity for two or five years. There is no driving record, no disqualification due to violations or accidents, and no practical or practical examinations.

The process for obtaining a driving license is as follows:

- (1) submission of application documents (a standardized application form and a doctor's certificate in the prescribed form along with identification documents),
- (2) physical examination,
- (3) theoretical training,
- (4) a computer-based testing (CBT) exam (e-exam),
- (5) a practical test, and
- (6) photo after passing the practical test.

Five Bangkok transport offices, 76 DLT regional offices nationwide, and 114 DLT regional branches are authorized to administer the driving tests. Examinations are generally on weekdays, and the time and order of the examinations depend on the office. Regardless of residency, one can take the exam at any office and have a license issued (the same applies for renewals). The following is an overview of each step in obtaining a driving license.

1) Submission of Application Documents

It is becoming a requirement to apply online in advance to avoid queuing up early morning. Even so, for the Bangkok Transport Office Area 5, located at the DLT main office grounds and is particularly popular, applications may be accepted as early as 6:00 a.m. in order to avoid confusion.

2) Physical Test

In addition to visual acuity testing, color vision testing (some offices nowadays only check signal colors and do not use color vision charts), visual field testing, and dynamic visual acuity testing are conducted.



Source: JET

Figure 7.3.1 Physical Examination (Dynamic Visual Acuity Test)

3) Theoretical Lecture

Supposedly a 5-hour lecture, many have substituted with a video (content has not been confirmed).

4) Theoretical Examination by CBT

Each examinee takes the test on a computer, and pass/fail results are displayed immediately after the test. Each PC is connected to the DLT headquarters via a secure line, and each testing site has surveillance cameras to ensure centralized control and prevent fraud. (Some offices give tests twice a day.)



Source: JET

Figure 7.3.2 Theoretical Examination

5) Practical Examination

Appointments are made after the applicant passes the theoretical examination. The practical examination is at the office's testing center although limited; although, the number of times it is administered may be limited depending on the size of the office.

In most cases, the examiner will verbally inform examinees if they pass or not after the exam. Unlike in Japan, the practical exam is not conducted on the road but on a driving test course at the testing center. In addition, as a general rule, vehicles are brought in, and examinees drive their own vehicles to the testing site. (Even if the examinee fails the practical exam, they can return home in their vehicle. Some examination centers offer vehicle rental for a fee.)



Source: JET

Figure 7.3.3 Practical Examination (motorcycles)

6) License Issuance

At this point, passers of the practical exam pay the examination fee for the first time and have their photo taken. Five minutes after the photo, the examinee collects their driving license in exchange for a certificate of payment of the examination fee. The photo machine is part of the secure driving license management system, which is connected to the main system at DLT headquarters.



Source: JET

Figure 7.3.4 Photography for Driving License

(4) Driving Schools

Those who have completed a prescribed course at a DLT-designated driving school are exempt from the practical and theoretical tests at the driving license center. The system is like that in Japan, where designated driving schools are required to conduct the prescribed course of study and practical training, assign qualified instructors and examiners, and set up a practical skills course in accordance with the standards. Some schools provide both on-course and on-road practical training, while others provide practical training only on the course.

There are 317 designated driving schools throughout Thailand, with 304 schools offering four-wheeled vehicle courses, 308 schools offering motorcycle courses, and 137 schools offering courses for vehicles subject to the Land Transport Act. Although exact figures are not available, approximately 90% of 540,000 people are estimated who obtained provisional licenses for four-wheeled vehicles, and 60% of 330,000 who obtained provisional licenses for two-wheeled vehicles in one year after graduating from a designated driving school and taking the practical test exemption system. In the case of four-wheeled vehicles, many examinees who did not attend a designated driving school learned through their parents or siblings and practiced in their neighborhoods. In the case of two-wheeled vehicles, many learned on their own while riding around with friends in their neighborhoods.

(5) Driving license renewal

Renewal of a driving license, including a provisional license, only requires a written application and physical examination and is valid for five years. Lifetime driving license holders do not need to renew and can keep their license for life.

(6) Review of Driving License System and Issues

In Thailand, it is said that 24% of four-wheeler accidents and 48% of two-wheeler accidents are caused by unlicensed drivers.¹ It is apparent that the effective way to reduce traffic accidents is to have unlicensed drivers obtain driving licenses with proper training and appropriate testing for safe driving. The cost of continuing to drive without a driving

¹ Table 3.46 and 3.47 of Final Report 2020, Motorcycle Accident Investigation: Micro Study Analysis (1,001 Cases) by Thailand Accident Research Center (TARC) and Asian Institute of Technology (AIT), December 2020, the percentages include inappropriate category of driving license holders and unknown

license should be costlier than obtaining a driving license, unlicensed driving should be effectively controlled and severely punished, and severe social sanctions should be imposed on unlicensed drivers (e.g., dismissal or expulsion from the workplace, a significant increase in compensation for accidents, etc.). The same must apply to drunk driving. However, these measures cannot be applied soon because not only the traffic police, which enforces the crackdowns but also judicial authorities (prosecutors, courts, lawyers, prisons, etc.), which handle legal actions against unlicensed drivers, have insufficient capacity (organization, budget, personnel, facilities, etc.) to implement such measures. Social sanctions also require broad public consensus. A broad public consensus is required to realize these measures, but this is unlikely to happen soon. Therefore, even for those seeking to obtain a driving license, the motivation to train and test for safe driving is not necessarily high, dragging down the aforementioned situation, and it is difficult to say that proper training and testing are being conducted.

In order to confirm this situation, WG4 (Driving Licensing System) reviewed the driving license system, including the motorcycle safety course for high school students conducted by DLT with funds from the Road Safety Fund and the status of driving license training in driving schools.

1) General Issues in the Driver's Licensing System

In many countries, the land transport authorities are in charge of the driver licensing system. Only a few, such as Japan, have the police in charge. This may be because many countries prefer the same department responsible for vehicle registration and driving licenses. In Thailand, the driving license administration was transferred from the Ministry of Police and the Ministry of Interior to the DLT in 1988, unifying the departments that handle vehicle registration and driving licenses, but an ensuing rift between the two ministries remains. It is said to be casting a shadow over effective cooperation between the two ministries on issues such as ensuring traffic safety, and that needs to be resolved. The issue will be addressed in this Project.

The following are some general issues with the driving license system.

- (i) Holders of lifetime licenses can continue using licenses without having to go through tests; however, some measures should be taken to prepare for the aging of life license holders. (In Thailand, the reform of the lifetime driving license system has been proposed twice so far, but there has been strong opposition from lifetime license holders. At this point, it is considered a high political risk

item and is rarely mentioned.)

- (ii) Driving licenses are by license category, and considering the management and supervision of driver's violation and accident history, it is necessary to issue driving licenses individually.
- (iii) The fact that the legal regulations for driving licenses are divided into two laws, the Vehicle Law and the Land Transportation Law, shows inconsistency in the two systems. (Some say this is a little more than a problem of system operation.) The vehicle registration and vehicle inspection systems are also divided into two laws.
- (iv) Based on the ratification of the "Vienna Convention on Road Traffic" (1968) (Japan ratified only the Geneva Convention of 1949), the driving license system is required to be in line with the Vienna Convention (May 2020). The transition to a European-based system is necessary within the five-year transition period.
- (v) From the driving license application documents, the medical certificate and physical examination must be the most recent. Especially for the doctor's certificate, it is said to be a skeleton, as many business-type stores around the DLT office virtually sell the certificate. LTSB will start updating it based on the "Health and Driving" report to be presented by the MOPH.
- (vi) LTSB has internal standards for examiners, processes, and scoring, but not strictly enforced. Some seem to ignore the fact. The practical exam contents also need improvement with more emphasis on traffic safety (i.e., whether it is possible to incorporate the necessary items and apply them rigorously to the extent it is feasible in practice). The following compares the practical test course in Japan (Kanagawa Prefectural Police Driving License Center Examination Center, the largest in Japan) and the DLT Area 5 practical test course (DLT main office), the largest in Thailand, at the same scale.



Source: Google Map

Figure 7.3.5 Kanagawa Prefectural Police Driving license Center Practical Test Center (upper left: motorcycles, right: four-wheeled vehicles)



Source: Google Map

Figure 7.3.6 DLT Area 5 Driving license Practical Test Center (motorcycles and commercial vehicles on the left, four-wheeled vehicles on the right)

(vii) Although the designated driving school system is gaining popularity among the Thai public, there are still many problems with the actual content of the lessons and theoretical and practical exams at the driving schools. In fact, some people are skeptical about the training at some driving schools, claiming they can obtain a license so quickly. It is difficult for DLT local offices to adequately supervise and

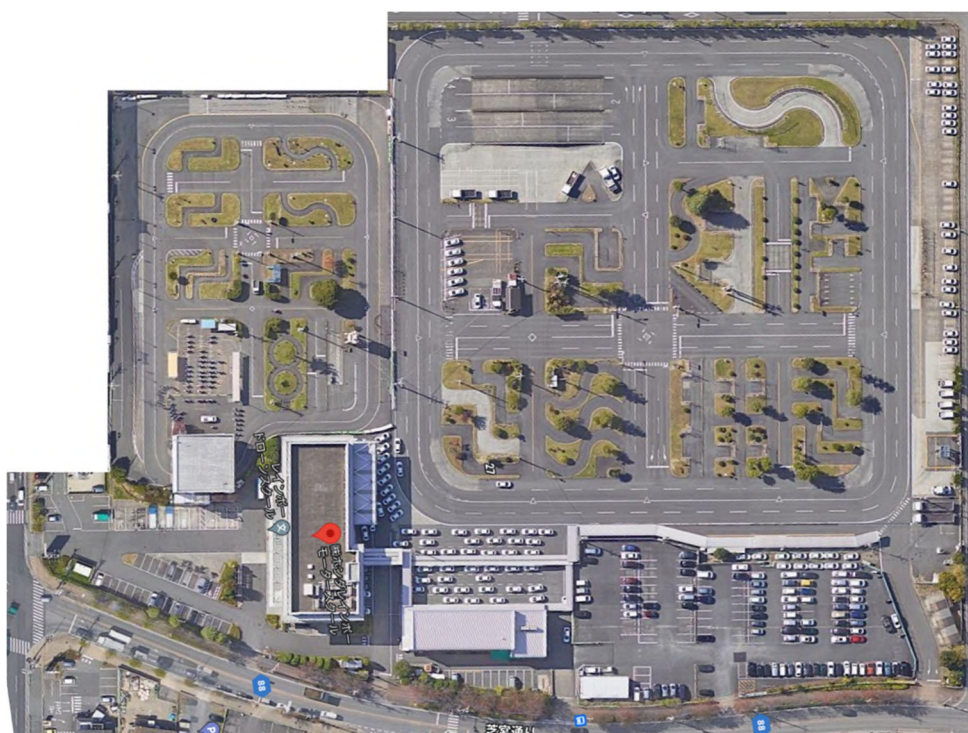
inspect these driving schools. In addition, there is a shortage of qualified instructors. There is also a high level of attrition among driving schools. Although the legally mandated training fee (1,200 baht for motorcycles and 4,500 baht for automobiles) has been kept low, the initial investment and operating costs are quite high. Furthermore, three prefectures still do not have designated driving schools, and the disparity in rural areas is said to be serious.

The following compares the driving schools in Japan (a typical one in Tokyo and a manufacturer-affiliated) and Thailand (a typical one in Bangkok and a manufacturer-affiliated) at the same scale.



Source: Google Map

Figure 7.3.7 Heiwabashi Driving School (Katsushika-ku, Tokyo)



Source: Google Map

Figure 7.3.8 Rainbow Driving School Wako (Honda-affiliated, Wako City, Saitama Prefecture)



Source: Google Map

Figure 7.3.9 TSL Driving School (Don Muang District, Bangkok)



Source: Google Map

Figure 7.3.10 Thai Honda Safety Driving Center (Bangkapi District, Bangkok)

(viii) The provisional license system is not fully functional and needs improvement. Introducing a graduated driving license issuance system, which is common in Europe, the U.S., and Australia, is necessary. It considers the improvement of driving skills and safe driving abilities (different from the provisional license system in Japan). In recent years, an increasing number of countries (regions) have adopted a system design that also considers the control of runaway behavior by young drivers. This system could be applied in Thailand, which is plagued by runaway behavior by young drivers.

(ix) When comparing the number of driving licenses issued in Thailand (Table 7.3.1) with the number of registered vehicles (Table 7.3.3), it is observed that the number of licenses issued for four-wheeled vehicles (including temporary licenses valid for 2 years) is 17,555 thousand, while the number of registered vehicles is 17,850 thousand (of which 7,404 thousand are commercial vehicles). For two-wheeled vehicles, the number of licenses issued (including temporary licenses valid for 2 years) is 12,758 thousand, whereas the number of registered

vehicles is 23,157 thousand (of which 171 thousand are motorcycle taxis), indicating that the registered vehicles are over 80% higher. It is assumed that a considerable number of individuals own multiple two-wheeled vehicles (including those owned for rental purposes). Additionally, it is estimated that nearly 50% of two-wheeled vehicle drivers are without a driving license,² which also contributes to this disparity.

The prevalence of unlicensed driving undermines the driving license system, and the DLT is actively addressing this issue by prioritizing the promotion of obtaining motorcycle licenses as one of their highest priorities.

- (x) The standards for the knowledge and skills required to obtain a driving license are not well documented or publicized. As a result, there are no standard training guidelines for driving schools, and the content of instruction and practical exams in schools and instructors vary.

2) Motorcycle Safety Training for High School Students

There are three motorcycle safety training for high school students observed: one in Bangkok, one in a provincial city, and one in a local area. The DLT staff members have been dedicated, even working on holidays, to implement each course, while cooperation from the high school side has been mixed. Each training course must be more systematic in defining the division of roles with the high schools and obtaining the cooperation of the local community, which will reduce the workload of DLT staff and enable the training to be offered to more high school students.

It also became clear that even with certain standards for course content, the actual course content and level of instructors vary widely in training courses and that standard textbooks and manuals must be enhanced and expanded in future training courses. The students seemed to understand the course content well and participated enthusiastically. Although it is not easy to evaluate the results of this course in terms of numbers, a high level of success is expected. The results of the detailed review and the status of activities for improvement will be detailed in "7.3.3 Encouragement of Motorcycle Licensing in Pilot Areas for Output 4."

² Table 3.46 and 3.47 of Final Report 2020, Motorcycle Accident Investigation: Micro Study Analysis (1,001 Cases) by Thailand Accident Research Center (TARC) and Asian Institute of Technology (AIT), December 2020, the percentages include inappropriate category of driving license holders and unknown

3) Status of training at driving schools

As part of the review of the status of driving licenses in Thailand, the expert in charge of WG4 (Driving Licensing System) trained at a general driving school for two-wheeled and four-wheeled vehicle driving licenses in Thailand. The expert discovered that schools have serious problems.

WG4 (Driver's Licensing System) focuses on training courses and exams at driving schools, which are expected to be effective in short periods, and will improve the driving license system. Furthermore, JET recommends restrictions on applying for a driving license at DLT without attending a driving school as a prerequisite for improving the training at the school.

(7) Proposed Driving License System

In light of these considerations, and after discussions with LTSB, the JET recommends the following driving license system reforms to the DLT.

- (i) Prevalent unlicensed driving is a reality that shakes confidence in the driving license system. As eradicating unlicensed driving is essential to realizing traffic safety, the highest priority should be to encourage to obtain appropriate driving licenses by all means possible.

Grasping the actual situation of unlicensed driving is not necessarily easy, but analyzing the situation and causes based on this understanding and promoting more reliable improvement measures are fundamental. At the same time, monitoring and evaluating the implementation status are indispensable. In the future, it is expected that the research institution proposed in item (v) will take on this responsibility and conduct continuous research. However, the hope is for universities and other research institutions to conduct investigations and research from various perspectives.

- (ii) Regarding the application of the Vienna Convention, it is necessary to study the situation of ASEAN countries that have already applied the Convention (the Philippines and Vietnam) and clarify the future vision of the Thai driving license system.
- (iii) The provisional license system shall be based on the Graduated Driving License and designed to achieve traffic safety. In the meantime, the existing provisional license system will be feasible, and the legal system will be revised only after confirming the

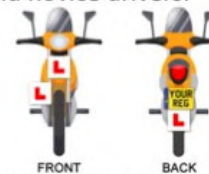
situation. This reform is needed in conjunction with the improvements to driving schools proposed in item (vi).

In the 3rd JCC, the DLT presented a proposal to improve its provisional license system, as shown in Figure 7.3.11, and indicated that it would proceed with the systemic study in the future.

3. Driving License

(1) Improvement of Provisional driving license

- The regulation of 2 year provisional driving license after passing examinations has almost no meaning except shortened validity period.
- Graduate Driving License (GDL) system was originally adopted in Australia in 1960s and now popular in the world. It has steps towards obtaining a full license. The provisional license step generally has some restriction of driving and lessons to be completed. After completion of the lessons and the period without violations and accidents, the provisional license shall be upgraded to a full license.
- It may also include restrictive driving implications for young and novice drivers.
- Example of Provisional motorcycle license holders (2 years);
 - Night driving restrictions (22:00 – 6:00)
 - Up to 250cc displacement motorcycles
 - Posting of L-plates front and rear
 - Half reduction points until suspension of the license
 - Immediate suspension for drunk and drug driving
 - No mobile phone (no Bluetooth headset talking, no attachment of the phone on the steering bar)
 - A supervised driver (5 years or more) shall guarantee 100 hour safe driving
- Example of Renewal to full motorcycle license (5 years);
 - No suspensions during provisional license period
 - Report of 100 hour safe driving report (signed by the supervised driver)
 - No additional examination



5

Source: JET

Figure 7.3.11 Proposals to Improve the Provisional Licensing System in the Third JCC

(iv) In the future, it may be impossible to complete the increasing number and rigor of subjects for practical training and exams for driving licenses at DLTs in various regions. In addition, it may also become challenging to provide human resources. Therefore, limiting the exam takers in the future (those driving for public purposes such as the military, police, and fire departments, those obtaining special licenses such as for road rollers, those who failed to renew their licenses, those converting foreign licenses, and others) and reducing the number of practical exams and exam locations conducted at DLT's practical exam courses should be considered. Private driving schools should hold practical exams for the general public.

Furthermore, this approach can reduce the burden on the limited personnel at offices, such as DLT regional offices. These staff members are also expected to be able to take on responsibilities that are anticipated to increase, such as overseeing and supervising driving schools and conducting safe driving training programs for high school students.

- (v) It is necessary to prepare standardized documents related to driving education, including texts for various driving license learners, instruction manuals for instructors, examination manuals for examiners, and manuals for DLT staff, among other purpose-specific documents. (Refer to "7.3.2 Development of Training Materials for Written Exams, Lectures, and Practical Training.") Furthermore, to continuously and technically review these documents and standards, it is necessary to establish research institutions and consider various measures, including assigning this task to DLT-operated driving schools.
- (vi) Improving driving education in driving schools is one of the keys to achieving traffic safety in Thailand. The following section provides details.

(8) Proposal of Improvement of Driving School Education

◆ Goals

- In order for driving schools to fulfill their original purpose and contribute to traffic safety in Thailand as a whole through training, the following goals should be achieved.
 - To realize a legal structure and social framework whereby driving is not allowed without a driving license.
 - To raise the quality of safe driving education at driving schools so those wishing to obtain a driving license are motivated to learn it and can drive safely and feel they cannot obtain a driving license unless they attend a driving school.
 - Introduce a system whereby driving schools are motivated in ensuring students are taught the prescribed course of study, complete it to a certain standard, and are punished when they fail to do so.

Figure 7.3.12 Proposals for Improvement of Driving School Education in the 3rd Seminar (1)

◆ **Conditions**

- The following conditions must be met to realize these goals.
 - To realize a legal structure and social framework whereby driving is not allowed without a driving license.
 - To raise the quality of safe driving education at driving schools so those wishing to obtain a driving license are motivated to learn it and can drive safely and feel they cannot obtain a driving license unless they attend a driving school.
 - Introduce a system whereby driving schools are motivated ensuring students are taught the prescribed course of study, complete it to a certain standard, and are punished when they fail to do so.

Figure 7.3.13 Proposals for Improvement of Driving School Education in the 3rd Seminar (2)

◆ **Measures**

- The following specific measures are proposed.
 - (1) Unlicensed driving should be strictly penalized as a criminal offense to deter it (i.e., all individuals caught driving without a license will be prosecuted as a criminal case by the prosecution, judicial decisions will be made in court, and criminal penalties will be confirmed. When a criminal penalty is confirmed, it will remain on the criminal record). In this case, those who drive without renewing their driving license will also be treated as unlicensed drivers (some grace period is necessary).
Furthermore, those who knowingly lend vehicles to unlicensed drivers, knowingly allow unlicensed driving, and knowingly accompany unlicensed drivers can be considered an accomplice liability.
In addition, unlicensed driving should be thoroughly controlled by traffic police. To this end, various measures, including financial support, should be implemented to facilitate the activities of traffic police, and measures to simplify and expedite the process from the traffic police's referral of suspects to the prosecution to the judicial decision and enforcement by the courts are also necessary.
 - (2) Grasping the actual situation of unlicensed driving is not necessarily easy, but it is essential to analyze the situation and causes based on this understanding and to promote more reliable improvement measures. At the same time, it is also indispensable for monitoring and evaluating the implementation status. In the future, it is expected that the research institution proposed in (v) will take on this responsibility and conduct continuous research. However, it is hoped that universities and other research institutions will conduct investigations and research from various perspectives.
 - (3) The DLT shall establish detailed training programs and examination standards and strictly inspect and supervise the implementation of the training programs at driving schools to ensure that they are strictly implemented. Furthermore, DLT will inspect and guide the management of driving schools, as necessary.

Figure 7.3.14 Proposals to Improve of Driving School Education in the 3rd Seminar (3, revised)

◆ **Actions**

- These recommendations could be realized as follows
 - Item (i) is outside the jurisdiction of the DLT and would require multiple legal amendments, so a specific implementation method is not proposed here. Items (ii) and (iii) are considered feasible for implementation by the DLT under the current legal framework.
 - If necessary, DLT will instruct the driving school association to improve the quality and discipline of driving schools. At the same time, to improve business conditions, fee guidance will be stopped and liberalized.
 - Extensive retraining and upgrading of teaching instructors and possibly an increase in the number of instructors will be required, and DLT will assist as needed.
 - Establish and publicize a medium- to long-term (approximately 10 years) implementation plan and manage the implementation status through the PDCA cycle.
 - Evaluate and review the system every five years and build an organization capable of sustainable development. (including technical aspects)

Figure 7.3.15 Proposals for Improvement of Driving School Education in the 3rd Seminar (4, revised)

◆ **Proposal to improve driving school education**

- Detailed motorcycle training program proposal
 - In motorcycle training, driving schools shall teach the following courses to students and require them to take practical and theoretical exams upon completion of the courses.
 - The details of the technical and theoretical training, as well as the evaluation method and evaluation forms for each trainee in the technical training, will be developed separately.

a) Theoretical training

Class	Contents	remarks
1	Driving license system, traffic regulations	
2	Traffic rules	
3	Hazard prediction	
4	Hazard prediction, vehicle registration and taxes	
5	Traffic accidents and insurance, traffic violations and penalties, drunk and drugged driving	

Figure 7.3.16 Proposals to Improve of Driving School Education in the 3rd Seminar (5)

b) Practical Training		
Class	Contents	Remarks
1	Clothing (including how to wear a helmet), riding posture, handling, starting and stopping	Wearing helmet and other protective gear, proper riding position (from left to right), riding posture, rearview mirror adjustment
2	Safety checks (getting in and out of the car, starting and stopping), brake mechanisms and operation (including ABS and CBS mechanisms), driving laps	Turn head, not just eyes, to check for safety. Check that the front and rear brakes work and operate.
3	Intersection traffic (changing course, right and left turns) and vehicle maintenance (including types of gasoline and refueling methods)	Stopping and checking for safety when passing through intersections
4	Basic driving (slalom, single bridge, crank, wavy road)	Driving perspective and riding posture Cranks can be implemented with new courses and cones on the training course.
5	Basic driving (slalom, single bridge, crank, wavy road) Confirmation of completion	Passage time measurement
6	Series of runs and first aid measures after changing from automatic to semi-automatic transmission	
7	Hazard prediction (thorough safety checks, hazard prediction, intersections with poor visibility)	
8	Hazard prediction through defensive driving (preventing right-on accidents, blind spots from 4-wheeled vehicles), U-turns, discussions for trainees	
9	Hazard prediction through emergency braking (if possible, experience with ABS or CBS) and emergency avoidance	
10	Overall driving and confirmation of completion of the project after changing from automatic to semi-automatic transmission.	

Figure 7.3.17 Proposals to Improve of Driving School Education in the 3rd Seminar (6)

b) Notes

- Strict dress code (no sandals, no short sleeves, no short pants)
- Helmet, gloves, and protector equipment
- Evaluation forms are prepared for each student every hour (kept for 5 years).
- Evaluation forms are reviewed by both the instructor and the student after each class.
- Thorough safety checks; students who fail to do so will not be allowed to proceed beyond 6th class.
- Training vehicles must comply with the standard specifications established by the DLT and be maintained according to maintenance guidelines. The maintenance status must be recorded, and DLT inspectors shall inspect the actual maintenance conditions and maintenance records along with the guidelines as necessary.
- Promote remote implementation of theoretical training, allowing students to attend classes via smartphones or other devices outside the driving school. If necessary, the DLT will create standard theoretical training contents and distribute them to each driving school. To ensure proper attendance of theoretical training, students' attendance will be monitored using the camera on their smartphones, and the driving school will certify their attendance. To prevent tampering, it is also necessary to consider storing video data in real-time on the DLT server.

The content of these videos shall be reviewed by DLT inspectors as needed. This measure allows driving schools to allocate instructors responsible for theoretical training to practical training and reduce the required classroom space, thereby improving the quality of practical training.
- For practical training, ensure the proper implementation of practical training and, for safety reasons, require all students to wear bibs. The implementation status of practical training will be recorded using in-vehicle cameras and cameras within the training course. To prevent tampering, it is also necessary to consider storing video data in real-time on the DLT server. The content of these videos shall be reviewed by DLT inspectors as needed.

Figure 7.3.18 Proposals to Improve Driving School Education in the 3rd Seminar (7, revised)

6) Issues in Implementation

- Creation and establishment of standard curricula (training content, training methods, number of trainees, training hours and courses, evaluation and grading guidelines, trainee management and evaluation management formats, creation of standard textbooks and standard curricula for theoretical and practical training)
- Creation and establishment of practical exam guidelines (exam content, exam methods, important considerations, grading guidelines, grading formats)
- Creation and establishment of maintenance guidelines for training vehicles (standard specifications for training vehicles, maintenance guidelines for training vehicles)
- Improvement and continuous re-education of training instructors
- Installation of video cameras in training schools and introduction of various systems (consider having the DLT develop a standard system and allowing each driving school to use it for a fee)
- Approval of an increase in training fees (adding various costs, raising the fee from approximately 1,000 THB to 1,500 THB)
- Ensuring consistency with the content of training courses for high school students
- Examination of the need for introducing a practical exam certification system (higher qualification for training instructors, regular training of examiners including DLT staff. Practical exams conducted at training schools should be part of the national examination delegated to the private sector, and private practical examiners found guilty of misconduct should be punished at the same level as public officials who commit fraud)

Figure 7.3.19 Proposals to Improve Driving School Education in the 3rd Seminar (8, revised)

7.3.2 Development of the Training Materials for the License Examination, Education and Training Programs

(1) Driving License Handbook

DLT published the first driving license handbooks (for motorcycles and standard passenger cars) on its website in 2022 and the hazard prediction handbook in 2023. Although these were first-edition publications, they contain points difficult to understand or insufficient for actual driving license learners to learn.

DLT decided to enhance these driving license handbooks to make them standard handbooks with comprehensive content then use them as the basis for textbooks for various driving license learners, instruction manuals for training instructors, test administration manuals for examiners, and so on.

WG4 (Driving Licensing System) will support the creation of a standard handbook by introducing the legal and regulatory system in Japan, its contents, and various manuals and textbooks in general use, and by recommending points that should be introduced in Thailand.

(2) Review of Driving license Handbook

JET reviewed and commented on the DLT driving license textbooks (Two-wheel, Four-wheel, and Hazard Prediction).

1) Purpose of the DLT Driving License Manual

- The purpose is unclear, whether it is a manual for studying and passing the driving license exam under DLT or meant to encourage new drivers to prioritize often safe driving as members of the automotive community. The latter is preferable.
- A foreword from DLT, preferably under the name of its head, expressing what it wishes to convey to new drivers would be advisable.

2) Composition of the DLT Driving License Manual

- The current DLT Driving license Manual consists of three books: Two-wheeled, Four-wheeled, and Hazard Prediction. Their structure is as follows:
 - Two-wheeled and Four-wheeled: Chapter 1: Traffic Regulations, Chapter 2: Safe Driving, Chapter 3: Driving Consciousness and Manners, Chapter 4: Emergency Response.
 - Hazard Prediction: Chapter 1: What is Hazard Prediction?, Chapter 2: Following Distance, Chapter 3: Hazard Detection and Prediction, Chapter 4: Relationship

with Other Road Users.

- Each section, including traffic laws, driving skills, hazard prediction and safe driving, and emergency response, could be separated for ease of reference after obtaining a driving license. Instead of the title "Traffic Laws," "Automobile Society and Traffic Regulations" is preferable.
- Currently, there is no consideration of alignment with the curriculum of driving schools. However, if a detailed curriculum is established for driving schools in the future (both theoretical and practical), it will be necessary to align the manual with the curriculum.
- These manuals are preferred to be designed with the awareness of serving as a foundation for the curriculum creation of driving schools even now.

3) Concerning Each Manual

(a) "Automobile Society and Traffic Regulations"

- Instead of explaining each regulation, it would be better to group by the situation a driver may encounter while driving, from easy to more challenging situations.
- Within the context of an automobile society, it's advisable to include the following:
 - Licensing systems and others related to traffic violations.
 - Besides the automobile registration system, simple guidelines for lending and borrowing, guidelines for car rentals, etc., should be provided under the responsibilities of vehicle owners.
 - Illustrate the kinds of insurance, insurance premiums and claims, claims payment conditions, etc., for both compulsory and voluntary insurance.
 - Illustrate recent trends in accident occurrences and accident statistics, such as the annual number of casualties, the annual number of individuals who become physically disabled, and the annual number of affected families, clearly and prominently. Alongside are details on compensation and penalties at the time of fatalities, the plight of victims' families, and the potential consequences for both uninsured perpetrators and victims and their families in case of an accident should be clearly stated. This would help learners understand the repercussions of causing a traffic accident.
 - Highlight relief methods for traffic accident victims and provide examples of government and private institutions that offer aid.
 - Describe driving under the influence as an absolute evil that should be vehemently rejected.
 - Mention also the considerations for the environment, such as eco-driving,

EV (electric vehicles), HV (hybrid vehicles), and PHV (plug-in hybrid vehicles).

(b) "Driving Skills"

While basic operations are well-covered, specific issues include:

i) For motorcycles:

- The description regarding brake operations is insufficient. Properly using the front and rear brakes is fundamental to safe motorcycle riding. Descriptions of the Antilock Brake System (ABS) and Combi Brake System (CBS) are also necessary.
- Including topics like lane changing, driving curves, making turns at intersections, filtering through traffic during congestion, U-turns, emergency braking and hazard avoidance, driving with a passenger is preferable, the dangers of riding against traffic or on sidewalks, and the protection of pedestrians and cyclists, under advanced riding.

ii) For ordinary vehicles:

- Most advanced driving techniques are covered, but including topics such as emergency braking, U-turns, protection of pedestrians and cyclists, and driving on expressways and motorways is also preferable.

(c) "Emergency Response"

- A separate booklet on emergency response is preferable so drivers can keep it in their vehicles.
- Describe specific initial actions to take in the event of a traffic accident, both when one is a direct party to the emergency response (whether as the perpetrator or the victim) and when one is a witness. Also, provide examples of how to report to ambulances and the police.
- Address responses during natural disasters, such as when roads are submerged in floods and cars seem immobile, when caught with rising water levels inside an underpass when the vehicle falls into water, how to leave the car during a major disaster, and methods to evacuate to shelters and manage vehicles.
- Illustrate how to use an Automated External Defibrillator.

(d) "Hazard Prediction"

- While the contents are comprehensive and excellent, many theoretical explanations might be challenging for actual drivers to understand. It is better to do repeated practical exercises to help drivers internalize the fundamental principles.

- It would be ideal to illustrate typical traffic accidents like right-angle collisions and provide diagrams for each, showing how to avoid them.
- Descriptions providing specific examples for predicting hazards under different weather conditions (nighttime, heavy rain, fog, floods, icy roads, snowfall) are desired.
- Provide descriptions with specific examples in predicting hazards for different road conditions (busy city streets, school routes, steep slopes, sharp curves, gravel roads, unpaved roads, roads with weak shoulders, construction sites, U-turns, etc.).
- Hazard avoidance techniques, especially those necessary for motorcycles (sudden braking, sudden steering, effects of ABS and CBS), should be mentioned.
- Concepts of defensive driving, hazard prediction driving, as well as tailgating, road rage, and anger management are better to be included.

(3) The Procedure for Creating a "Driving license Textbook"

1) Discussion on the Procedure for Creating a "Driving License Textbook"

Based on these comments, the future direction and procedure for creating the "Driving license Textbook" were discussed. The following conclusions were reached:

- The "Driving License Textbook" should demonstrate DLT's basic stance on driving licenses and safe driving to the public, incorporating legal interpretations and similar content.
 - In Japan, the "Teaching Rules Concerning Traffic Methods," announced by the National Public Safety Commission, clearly explains traffic rules based on the Road Traffic Law and related regulations. While it is unrealistic to adopt the extensive document of Japan as it is, it is desirable to incorporate DLT's standard interpretations.
- The "Driving License Textbook" should be the foundational document for future manuals. The work on the student textbooks and instructor manuals for high school motorcycle license courses is already underway, but these documents should also conform to the "Driving License Textbook."
- Translate the "Driving License Textbook" into other languages for accessibility to foreign residents, specifically English, Chinese, Burmese, and Khmer are envisioned, with the possibility of including Malay-Indonesian, Vietnamese, Russian, Korean, Japanese, and Russian.
 - There is significant value in DLT officially announcing this, as incorrect information regarding driving license acquisition circulates among foreign residents.

2) Proposal for the Proofreading of the "Driving License Textbook"

Based on the above discussions, the responsible experts suggested the following structure for the "Driving License Textbook."

Volume 1: Automobile Society and Traffic Regulations 1. Principle of Driving 2. Traffic Laws and Regulations 1) Obeying Signals 2) Obeying Signs and Markings 3) Where Vehicles May or May Not Traverse 4) Giving Way to Emergency Vehicles 5) Driving Intersections and Railroad Crossings 6) Safe Speed and Following Distance 7) Pedestrian Protection, etc. 8) Safety Checks, Signaling, and Use of the Horn 9) Changing Lanes, etc. 10) Overtaking 11) Passing Oncoming Traffic 12) Parking and Stopping 13) Boarding and Loading 14) Towing 15) Driving on Expressways and Motorways 3. Automobile Society 1) Driving Licensing System and Traffic Violation Penalty System 2) Essentials for Vehicle Owners 3) Mandatory and Voluntary Insurance 4) Traffic Accidents and Their Tragic Consequences 5) In Case of Traffic Accidents 6) Drunk and Drug-induced Driving 7) Eco-Driving and Energy-saving Driving	Volume 2: Driving Skills (By Vehicle Type) 1. Basic Operations and Basic Driving Techniques 2. Advanced Driving (Including Expressway and Motorway Driving for Ordinary Vehicles and 2-seater Driving for Motorcycles) 3. Vehicle Maintenance and Management 4. Latest Automobile Technology Volume 3: Hazard Prediction and Safe Driving 1. Hazard Prediction and Predictive Driving 2. Safety Checks and Blind Spots (Including Commentary on Right-angle Accidents) 3. Human Capabilities and Driving 4. Natural Forces Affecting Vehicles and Their Impact on Driving 5. Driving Under Adverse Conditions 6. Hazard Avoidance 7. Defensive Driving 8. Hazard Prediction Exercises Volume 4: Emergency Response 1. Essentials During an Accident 2. First Aid Measures (Including Use of AED) 3. Disaster Response Endnotes 1. Road traffic law 2. Land transportation law 3. Other related laws and regulations
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Source: JET

7.3.3 Encouragement of the Acquisition of Motorcycle License in the Pilot Areas

(1) Safe driving course for high school students in Thailand

1) History of Safe Driving Education for High School Students in Japan

In the 1970s, Japan experienced a rise in traffic accidents involving young people. Reckless driving and noise pollution by biker gangs also contributed to a negative image of motorcycles as dangerous vehicles associated with delinquency. In 1982, the National Federation of High School PTA Associations, concerned about the safety of high school students, adopted the "Three No's Movement" during a Sendai conference that aimed to prevent high school students from obtaining motorcycle licenses or riding or purchasing motorcycles.

At the same time, there was a growing recognition that young people, including high school students, needed driving education tailored to their needs. It was believed that learning about traffic safety while riding a two-wheeled vehicle would enable them to practice safe driving. In 1982, the International Association for Traffic and Safety Sciences (IATSS) began its research on traffic safety education for high school students. Based on the results of training courses involving high school teachers and students, guidelines were developed.

Although the "Three No's Movement" did not achieve the expected results and effectively ended in 1992, the social stigma against two-wheeled vehicles persisted. Many high schools still prohibit or restrict students from obtaining motorcycle licenses. However, in rural areas, many high school students rely on two-wheeled vehicles (mopeds) for commuting. In the 1990s, safe driving education for high school students (mainly focusing on mopeds) began to be offered based on the aforementioned guidelines.

In the 21st century, the declining population in rural areas has led to a decrease in the number of high schools and high school students. Simultaneously, public transportation, which was necessary for commuting, has also been declining. As a result, the need for safe driving education for high school students remains strong.

Today, the "Traffic Safety Work Plan" by the Ministry of Education, Culture, Sports, Science and Technology states that it is necessary to "provide comprehensive guidance on safety related to bicycles and two-wheeled vehicles" and "strive to develop the qualities and abilities necessary for drivers in general." Based on this, safe driving education for high school students is conducted as needed in cooperation with the Board of Education, high schools, the police, the Traffic Safety Association, manufacturers, retailers, the Japan Motorcycle Promotion and Safety Association, and driving schools. (However, since there is no single entity responsible for its implementation, the total number and overall picture of such education are unknown.)

2) Motorcycle Safety Training for High School Students in Thailand

In Japan, schools are responsible for ensuring the safety of their students, including traffic safety on their way to and from school, in cooperation with the police, local governments, and the community. In particular, during the compulsory education period, the government is responsible for ensuring that students who have difficulty

commuting by walking, cycling, or public transportation have access to transportation, such as school buses.

In contrast, the schools in Thailand are only responsible for ensuring safety within their premises. As a result, schools and educational administration are not very concerned about the safety of students on their way to and from school. It is generally considered that parents are primarily responsible for the safety of their children on their way to and from school.

As a result, it is not uncommon for students to ride motorcycles without a license, not only those given to them by their parents but also elementary and middle school students. This has become a norm and is one of the factors contributing to the high number of traffic accidents. In response to this situation, where the driving culture of adults who drive without a license is passed on to children, DLT has been conducting safe driving training for high school students since 2019 using funds from the Traffic Safety Fund. Through this training, approximately 100,000 high school students have obtained a motorcycle license. The implementation status is shown below.

- Target schools: For decision by the local DLT office in consultation with the LTSB.
- Target participants: High school students, approximately 50 people per course (selection of participants, etc., are for the school to decide)
- Training venue: Target school or local DLT office
- Examination venue: Practical examination at the target school or local DLT office, theoretical examination at the local DLT office
- Schedule: 1.5 days, but possible in 1 day
- Training curriculum: Follows the motorcycle training at driving schools without specific guidelines
- Instructors and practical examiners: Outsourced, mostly dispatched by Honda at their expense
- Role of high schools: Depends on each school. Some schools actively participate in the training as part of education, and some just rent out the space.
- Passing rate: 90% or higher, can be less than 50% for one-day courses

- 3) Results of the site visit for motorcycle safety training courses for high school students
The following three sites were observed for their implementation of safe driving

courses for high school students by DLT. (A secondary school is an educational institution that combines junior high school and high school.)

- i) 26 February 2022: DLT Bangkok Area 2 Office (Taling Chan)



Source: JET

Figure 7.3.12 Motorcycle Safety Training Course for High School Students at DLT Bangkok Area 2 Office (Taling Chan)

Outline:

Participants: Approximately 110 (across 3 schools, one is a vocational high school; 15–20 years old; teachers also participated, totaling less than 10).

Venue: DLT office

Schedule: The program started at 9:00 a.m., with the morning course consisting of theoretical training, followed in the afternoon by a practical skills course, a practical exam, a physical exam, and a theoretical exam.

Training Curriculum: The theoretical training includes very basic traffic knowledge, such as traffic signs. Paramedics gave first aid instructions. The practical course required students to ride the test course. All but one of the participants were experienced riders and drove out smoothly on the motorcycles.

Instructors: Outsourced, instructors from nearby driving schools, etc.

Passing Rate: Only 21 students (24%) passed, probably due to the lack of preparation for the theoretical exam. Several high school teachers also took the theoretical exam, but only one passed.

- ii) 3–4 March 2022: DLT District Office and Chum Puan Secondary School, Phimai District, Nakhon Ratchasima Province

Project Completion Report



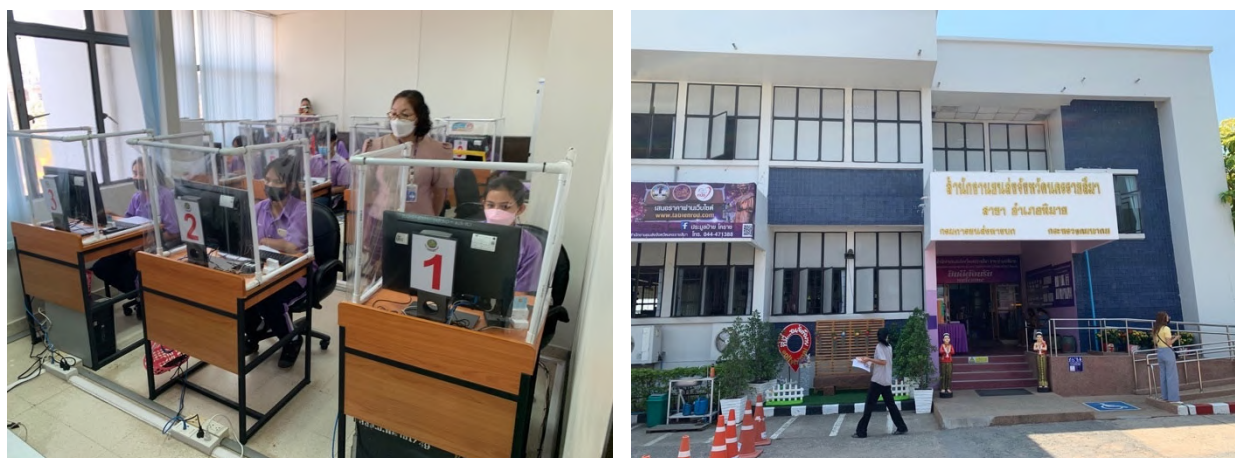
Source: JET

Figure 7.3.13 Motorcycle Training Course for High School Students at Chum Puan Secondary School (Theoretical Training)



Source: JET

Figure 7.3.14 Motorcycle Training Course for High School Students at Chum Puan Secondary School (Practical Training and Exam)



Source: JET

Figure 7.3.15 Theoretical Exam Status at DLT District Office, Phimai District, Nakhon Ratchasima Province

Outline:

Participants: 56 high school students (15–19 years old)

Training and Examination Venues:

- Target high school for the classroom and practical training courses.
- Local DLT office for the physical examinations and written examinations.

Schedule:

Day 1:

- Morning: Classroom training on traffic rules and regulations
- Afternoon: First aid training, practical training, and practical examination

Day 2:

- Morning: Travel from the high school to the DLT office by bus for the physical and written examinations
- Closing ceremony by the DLT director before 12:00 PM

Training Curriculum:

- Local traffic police officers conducted the classroom training. The focus was on traffic signs, signals, and traffic accident statistics.
- A nurse gave the first aid training. It included graphic photos of accident scenes and patients.
- The practical training was under limited time. The instructor effectively engaged the students while explaining riding posture and the differences and applications of front and rear brakes.
- The practical examination assumed that the participants could ride the test course, and all drove the motorcycle smoothly.

Instructors:

- A local traffic police officer was the classroom instructor who was passionate about safe driving education.
- A Honda instructor was the practical instructor. The content and methodology of the training seemed very similar to that of the Honda instructors in Japan.
- Honda dispatches instructors to the safe driving training for high school students at its own expense.

Project Completion Report

Pass Rate:

- Out of 56 participants, 55 passed the training, resulting in a pass rate of 98%. The participants were very enthusiastic and achieved excellent results.
- The high school teachers were enthusiastic and actively participated in the training. They expressed their desire to continue holding similar training courses in the future to promote driving license acquisition and traffic safety among their students.

iii) 7–8 March 2022: DLT Provincial Office and Ratcha Bolikha Secondary School, Ratcha Buri, Ratcha Buri Province



Source: JET

Figure 7.3.16 Motorcycle Safe Driving Training for High School Students at Ratchabolikar Secondary School (Theoretical and Practical Training)



Source: JET

Figure 7.3.17 Motorcycle Safe Driving Training for High School Students at Ratchabolikar Secondary School (practical exam)

Summary:

Participants: 48 high school students (15–19 years old)

Training and Examination Venues:

- Target high school for the classroom and practical training courses.
- Local DLT office for the physical examinations and written examinations.

Schedule:

Day 1:

- Morning: Classroom training on safe driving principles
- Afternoon: First aid training, practical training, and practical examination

Day 2:

- Morning: Travel from the high school to the DLT office by bus for the Physical and written examinations
- Closing ceremony by the DLT director before 12:00 PM

Training Curriculum:

- A former DLT employee conducted the classroom training was conducted by. The focus was on practical aspects of safe driving.
- The practical training, despite the limited time, focused on instilling the habit of checking for safety before riding, starting, and dismounting. This is an aspect lacking in the Thai curriculum and was, therefore, very useful.
- The practical examination assumed that the participants could ride the test course and allowed them to do so. All participants drove the motorcycle smoothly.

Instructors:

- The classroom instructor was a former DLT employee who is now engaged in safe driving education after retirement.
- A Honda instructor was the practical instructor. As with Chumphon Middle School, the content and methodology of the training seemed to be very similar to that of the Honda instructors in Japan.

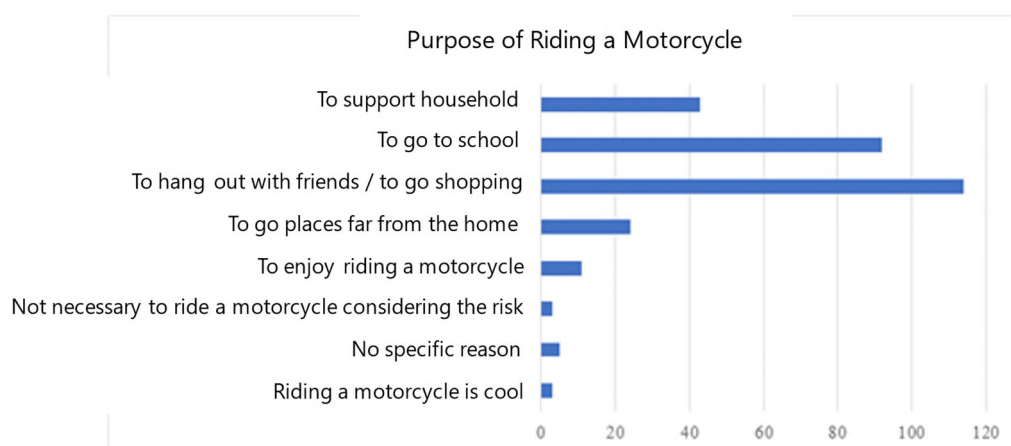
Pass Rate: Out of 48 participants, 33 passed the training, resulting in a pass rate of 69%.

iv) Results of the safe driving course for high school students

- The students' efforts are serious. Although it is a one-off, the fact that they obtained their licenses through formal theoretical and practical training is considered a significant accomplishment compared to continuing to drive without a license.
- Since most of the trainees have driving experience, some effort needs to be made in the implementation of the skills training.
- There are no instructional guidelines for both theoretical and practical training, so they are conducted at the discretion of the instructor. The technical training provided by Honda instructors is at the same level as in Japan.
- The burden on DLT staff was significant. In particular, the training course at DLT's Bangkok Area 2 office, held on a Saturday, required more than 10 DLT staff to work on Saturday for this purpose.
- Obtaining a license in a one-day course is not easy. It should be at least one and a half days.
- The contents of academic and technical training courses are not necessarily comprehensive due to time constraints. When preparing instructional guidelines, it is necessary to include instructional content while considering priority issues.
- The level of involvement in the high schools will determine the success of the training courses. At Chum Puan Secondary School, many students are expected to get a job after graduation, and there seems to be a desire to have students learn safe driving as a task at hand. On the other hand, many students at Ratchabolikha Secondary School are expected to go on to higher education after graduation, and it is assumed that they are busy with their classes rather than driving safely.

In addition, a simple awareness survey was conducted for students, teachers, and parents at the three training sites. The results are very interesting, as this type of survey on traffic safety has not been conducted in Thailand until now. (The total number of student responses was 137, with duplicate responses.)

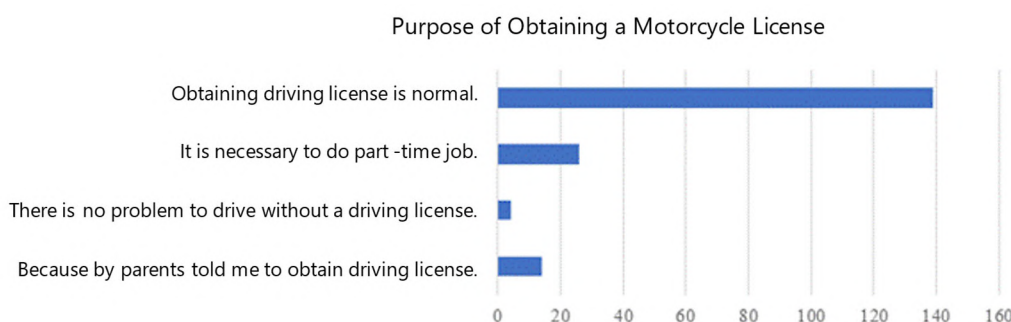
- The main purposes of driving motorcycles are to go to school and socialize with friends. Many also use them for part-time work.



Source: JET

Figure 7.3.18 Attitude Survey Results (Purpose of Riding a Motorcycle)

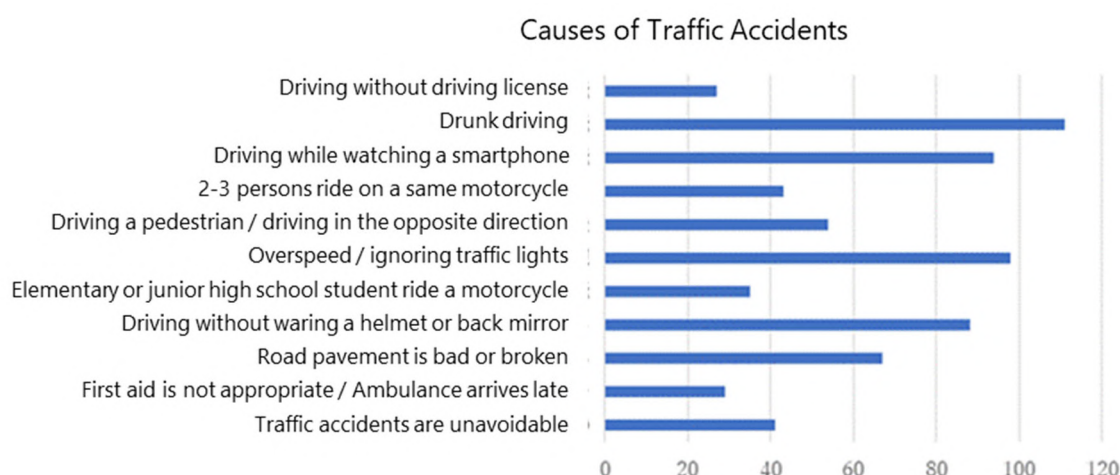
- Students understand that they need a driving license to drive, and they want to get one.



Source: JET

Figure 7.3.19 Attitude Survey Results (Reasons for Obtaining a Motorcycle License)

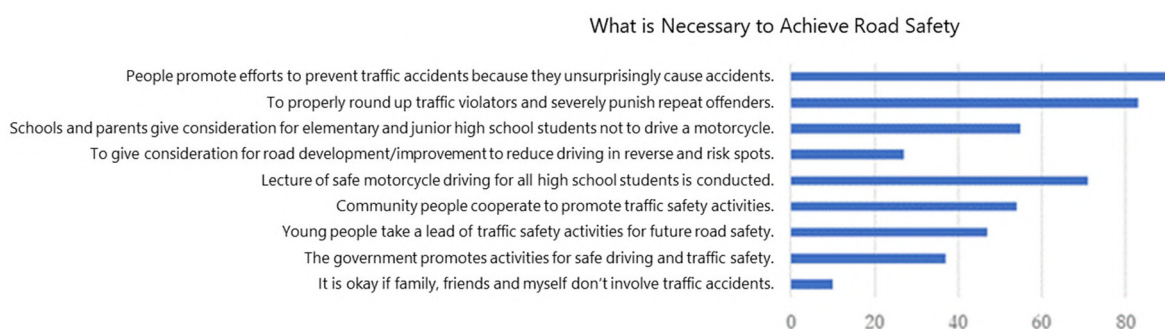
- Most traffic accidents are known to be caused by drunk driving, excessive speeding, and driving on smartphones.



Source: JET

Figure 7.3.20 Attitude Survey Results (Causes of Traffic Accidents)

- As measures to achieve traffic safety, the high school students recognize the need for accurate detection and strict penalization of traffic violations, broader implementation of training courses like this, and not allowing elementary and middle school students to drive. They recognize these as issues that require effort.



Source: JET

Figure 7.3.21 Results of Attitude Survey (Needed to Achieve Road Safety)

The students seem to understand the traffic safety situation in Thailand, and it is assumed that maintaining and raising their awareness of traffic safety through training courses such as this is important for realizing traffic safety.

(2) Improvement of motorcycle safe driving training for high school students

1) Approach to improving safe driving courses for high school students

Based on the results of the site visit to the safe driving course for high school students and the dialogue with the LTSB, the following is the JET's concept for improving the safe driving course. The funding source is the Traffic Safety Fund, and the concept is based on assuming the necessary budget can be secured.

- i) The younger generation should not take over the driving culture of the adult generation but build a new traffic safety culture. To this end, the goal is to ensure that all high school students who wish to drive motorcycles (or all students who may drive motorcycles) in the future can take a safe driving course and obtain a motorcycle driving license. (The population of 15-year-olds is approximately 850,000. Among those, 600,000 will be trained annually. By doing this for 10 years, 6 million people will become licensed motorcyclists, creating a generation that practices traffic safety.)
- ii) Reduce the burden on DLT and outsource most of the work.
- iii) In order to standardize the content of the training, develop a standard instruction manual and textbook, incorporating necessary items (safety check, hazard prediction, emergency braking, etc.).
- iv) Clarify the role of the high school side.
- v) Establish an implementation system that can be carried out.

The initial proposed training program is as follows. This program was for two days, including the departmental exam. It was reduced to one and a half days, the same as before, in consideration of the feasibility of implementing the program in high schools.)

(1) Theoretical Training (in high schools)

- More than 5 hours
- Relevant laws and regulations (Motor Act / Highway laws and Land Transport Act)
 - Driving License system (including penalties)
 - To comply traffic signals and signs
 - Roads where vehicles can drive and not
 - Passing Crossings and merging onto the highways
 - Safe speed and distance
 - Protection of vulnerable road users (pedestrians, children, elderly, and bike riders)
 - Changing lanes, overtaking, passing each other
- Safe confirmation, risk prediction, hazard avoidance, and blind spots from other vehicles
- Driving manners and anger management
- Traffic accidents
 - Reality of traffic accidents (what happens when a traffic accident occurs? From the viewpoints of a victim and a perpetrator)
 - Effects of alcohol and drugs
 - Exposure and impairment of motorcycles
 - Emergency procedures, assistance and first aid when accidents occur
 - Compensations and insurances
- Vehicle registration
 - Registration procedure, tax payment and a registration plate
 - Vehicle inspection and modification
 - Seating capacity
 - Responsibility of the owner of the vehicle

(2) Practical Training (in high schools)

- More than 5 hours
- Appropriate wear and equipment when driving a motorcycle
 - Long sleeve shirts, long pants, shoes, gloves
 - Helmets (explanation of the importance and limit, types, size, correct fastening, etc.)
 - Protectors (chest, knees, elbows, legs, etc.)
- Pre-ride inspection
- Driving posture
- Safe confirmation of riding on the motorcycle, starting, turning, changing lanes, and stopping
- Driving and complying traffic signals and traffic signs
- Driving to avoid obstacles by not stopping and not touching the drivers' feet on the ground
- Driving and balancing on narrow road
- Driving small radius rotation and U-turn
- Emergency braking (experience)

- 2) Discussions at interministerial committee meetings and preparation of texts and manuals

A committee consisting of DLT, Directorate General of Basic Education, Ministry of Education, Directorate General of Vocational Education, Ministry of Education, RTP, TAIA, and TMEA (Secretariat: LTSB, JICA experts are technical advisors) was established to discuss the issue about the proposed training program. Initially, discussions were scheduled to begin in May 2022, but the response from the Ministry of Education was

delayed. Therefore, the participating members were decided in August 2022, and discussions began in April 2023.

The DLT was responsible for the theoretical training, while TAIA and TMEA for the technical training. The Ministry of Education completed compiling the draft textbook and instruction manual for high school students by October 2023. Furthermore, in December 2023, the LTSB briefed the DLT local offices, which can select and commission instructors.

(3) Pilot Projects

1) Selection of implementation targets for the pilot project

The project requested LTSB to conduct a pilot project on a motorcycle safe driving program for high school students in Nakhon Ratchasima, Suphan Buri, and Samut Sakhon Provinces, using the newly developed textbook and manual. The project will conduct two training courses for 50 students in each province.

The DLT local office has the authority to select the high schools for the motorcycle safe driving program and can determine the training schedules and lecturers. The target high schools have concluded an MOU on traffic safety for students commuting to school with the respective DLT offices. These schools are more aware of traffic safety than most high schools. It was unavoidable that these high schools were picked because of their ties to the respective DLT local offices and their flexibility for a pilot project.

In addition, students from high schools and vocational schools are generally more conscious of the fact that most of them will be employed after graduation, compared to other high schools where many aim to go on to universities. This is because many of the jobs available to vocational school graduates require motorcycle commuting, and in recent years, the number of workplaces requiring students a driving license to commute to work on a motorcycle has been increasing. (Even among high school students known for academic advancement the allure of motorcycles is considered the same. It is said that a certain number of students ride motorcycles in secret and cause serious accidents. This trend is reminiscent of the "Three No's Movement" once extended in Japan.)

The high school in Nakhon Ratchasima Province was canceled in early February due

to the proximity of the test period. Instead, the test will be at a high school in Baan Khuntian District, Bangkok Metropolitan Administration, in mid-February.

2) Pilot Project Evaluation Methodology

i) Approach to evaluation indicators

The motorcycle safe driving training for high school students conducted at DLT is similar to an educational program, and the evaluation indicator is the number of participants who obtained a motorcycle driving license. This is appropriate in the same way that improvements in the advancement rate are used to evaluate educational programs in general. (The practical exam pass rate for course participants is almost 100%, and the pass rate for the theoretical exam is about 95%.)

On the other hand, the impact of this program, i.e., the causal relationship between reducing traffic accident fatalities and the ratio of first-party fatalities between unlicensed drivers and licensed drivers, has not been shown in figures due to statistical difficulties even in Japan, although it can be intuitively expected that the former is higher. (According to estimates by the Chiba Prefectural Police in 2021, the ratio is approximately 2.5 times higher, and according to estimates by the Saitama Prefectural Police in 2019 and the Osaka Prefectural Police in 2021, the ratio is approximately three times higher. Note that most unlicensed drivers in Japan are due to having their licenses revoked or suspended and driving without an appropriate license). This estimate is possible only in Japan, where traffic accident investigations function well, and the accident database and the driving license database are 100% linked. In Thailand, this would be difficult because of unreliable accident database and poorly linked driving license database.

Therefore, in evaluating the pilot project within this program, participating students answered questionnaire surveys before and after the training course, similar to the evaluation methods used in general educational projects.

Another survey and comparison of the helmet-wearing rate before and after the training session of each high school was also considered, but since all the target high schools signed an MOU with the regional DLT office and had a helmet-

wearing rate of over 90%, so those were not conducted.

ii) Questionnaire survey

The survey used Google Forms, assuming almost all students brought their smartphones, for ease of distributing the survey (using QR codes), collecting responses, and tabulating.

a) Pre-training survey

The survey forms were distributed on the day of the training course, right before starting. Most responses were collected by the end of the training course. The survey form is shown in Appendix 1.

b) Post-training survey

The survey forms were distributed to the training course participants by the teachers in charge of each section at each school through the regional DLT office on 20 March 2024. The responses were collected in March. The survey form is shown in Appendix 2.

3) Implementation of pilot projects

i) Samut Sakhon Province

Using the student textbook and instructor's manual for motorcycle training for high school students newly prepared by DLT, there was a training course at the Baan Beu Vocational School on 22 and 24 January 2024. This was the first time that textbooks and manuals were used in training courses. The instructors for each training course, both theoretical and practical, were from two driving schools commissioned by the DLT Samut Sakhon office.

In the theoretical training, although there were some issues with time management, the instructors at each driving school had a relatively good understanding of the instructor's manual. On the other hand, in practical training, the focus was on practical instruction equivalent to the exams at the DLT driving license center, as traditionally done in training courses. Consequently, the new proposals in the current manual, such as safety checks and brake instructions, did not seem to be well-reflected.

Even though there is still room for improvement, compared to previous trainings that were essentially conducted at the discretion of each regional DLT office and individual instructors, conducting the training with well-organized content resulted in a significant qualitative improvement. This suggests that future implementation and improvements are promising.

In evaluating the pilot project, the initial plan was to conduct a questionnaire survey and a survey on the helmet-wearing rate of students. On the other hand, the target school concluded an MOU on road safety with DLT Samut Sakhon Office and was working on the MOU's goal of a 100% helmet-wearing rate. Therefore, it was decided not to do the helmet use survey but only the questionnaire prior to the training course.



Source: JET

Figure 7.3.22 Training in the Pilot Project in Samut Sakhon Province

ii) Suphan Buri Province

Following the January training course, DLT had a training course at Bang Pla Ma High School in Suphan Buri on 9 and 16 February, using the new textbook and manual.

The training course on 9 February was commissioned externally by the DLT Suphan Buri office for theoretical and practical training. The local traffic police, nurses from a local hospital, and instructors dispatched from a local Honda dealer conducted the theoretical training, while the Honda instructors conducted the practical training.

During the theoretical training, the traffic police officers and nurses did not seem to fully understand the new textbook and manual. Their lectures were far from the contents, and they took up more time than they should have. However, in the end, the Honda instructors managed to cover all the materials. The practical training of the Honda instructor was excellent, as they followed the concepts of the new textbook and manual.

The DLT local office hired the instructors; therefore, the JET member in charge asked the DLT headquarters officer (who traveled with the expert team on the spot) to improve the situation.

On 16 February course, Honda instructors were in charge of theoretical and practical training sessions. Both training sessions were conducted in accordance with the new textbooks and manuals. The points pointed out in the previous course regarding safety during the practical training were also adequately addressed.

Perhaps the DLT regional offices do not have a clear picture of what a training course based on the new textbook and manual should be.

The school has an MOU with the DLT Suphan Buri Office, and with a helmet-wearing rate of over 90%, it did not conduct the same survey as in the previous month.

Project Completion Report



Source: JET

Figure 7.3.23 Training in the Pilot Project in Suphan Buri Province

iii) Baan Khuntian District, Bangkok Metropolitan Administration

The pilot project was originally scheduled in February in Nakhon Ratchasima Province. Instead, due to the lack of cooperation from the province at the last minute, the pilot project was held at Pateppaleepol Technological College Baan Khuntian District, Bangkok Metropolitan Administration, on 15 and 16 February.

The local traffic police and DLT personnel conducted the classroom training, and the Honda instructors conducted the practical training. Both training sessions followed the new textbooks and manuals. Similar to the previous two schools,

no helmet-wearing survey was conducted since the school has an MOU with the DLT regional office and has a high helmet-wearing rate.

4) Evaluation of pilot projects

i) Pre-training Survey

The questionnaire was distributed in the morning before the training courses at each school. Most responses were collected before the end of the training courses. The total number of responses was 304, but non-responses some items where the number of were not properly accounted for, so the total number of responses for each item does not necessarily add up to 304.

In addition, Question 4.2 in the questionnaire asked about the traffic accident experiences of the students' relatives, but the definition of relatives in the question was insufficient, and it was judged to have little statistical significance, so it was not compiled. Questions 4.1 and 4.2 also asked about the causes of the accidents, but similarly, the definitions of the causes of accidents in the questions were insufficient, and it was judged to have little statistical significance, so they were not compiled.

The succeeding pages show the survey results, and below is the summary of the results and considerations.

- (a) 90% of the students have driving experience, and more than half of these have more than three years of driving experience.
- (b) The main reasons for riding a motorcycle are commuting to school, going out with friends for leisure or shopping, and part-time jobs.
- (c) 69% of the students learned to drive from their families, and 24% of the students learned to ride a motorcycle on their own.
- (d) 97% of the students understand the necessity of obtaining a driving license in accordance with the law.
- (e) 58% of the students are confident in their ability to drive safely.
- (f) When driving, 92% of the students wear helmets, and 78% of the students obey traffic signals. On the other hand, only 42% of the students wear shoes instead of sandals, and only 48% refrain from carrying more than two passengers on a motorcycle.
- (g) Already half of the students have experienced a traffic accident (including minor accidents such as solo falls).

- (h) In response to the question about the main causes of traffic accidents (multiple answers allowed), 80% cited drunk driving, and 72% cited speeding or ignoring traffic signals. However, fewer students chose unlicensed driving (41%) or driving by elementary and junior high school students (38%), and 28% of the students responded that traffic accidents are unavoidable and that victims should accept it as fate.
- (i) Regarding the responsibility for traffic accidents, 48% of the students believe that road users should comply with traffic rules and 17% call for stricter police enforcement.
- (j) In response to the question about what is necessary to achieve traffic safety (multiple answers allowed), 64% of the students believe that drivers should prevent accidents, and 50% support stronger enforcement and penalties by the police. Additionally, 51% of the students call for a broader implementation of safe driving courses for high school students, and 48% call for more practical training. However, only 32% and 33% of the students support preventing elementary and junior high school students from driving and improving roads with consideration for residents, respectively. On the other hand, about 17% of the students believe that as long as they, their families, and friends are not involved in accidents, others do not matter.

The following considerations can be drawn from these survey results:

- (a) "Nearly half of the students are estimated to have driving experience since elementary or junior high school. They learned to drive from their families or on their own. Although nearly 60% of the students are confident in their safe driving abilities, half of the students have experienced traffic accidents." This indicates that the students mistakenly believe that they have become capable of safe driving simply because they have acquired some knowledge of motorcycle operation.

Since they were unlicensed, they did not have the opportunity to receive safe driving education through video courses or training at driving schools when obtaining a license, and thus did not have the opportunity to correct this misconception. This is also reflected in their underestimation of the negative impact of unlicensed driving and driving by elementary and junior high school students.

- (b) Furthermore, although it is a minority opinion, the presence of views such as resignation to traffic accidents and the belief that it is

acceptable as long as they themselves are safe indicates a lack of opportunities for safe driving education among the students.

- (c) On the other hand, half of the students expressed a desire for the expansion and deepening of safe driving courses for high school students, and it is necessary for adults to sincerely listen to these voices.
- (d) Although this survey was conducted among high school students, it is presumed that adults who continue to drive without licenses for long periods also lack opportunities for safe driving education and have similar misconceptions (being able to operate a vehicle = being confident in safe driving). To correct this, safe driving education (i.e., obtaining a driving license) is necessary.

However, for adults, it is not easy to bring about behavioral change, and strong enforcement measures (arrests and punishments) are presumed to be necessary as a preliminary step to correct their thinking and actions before providing safe driving education.

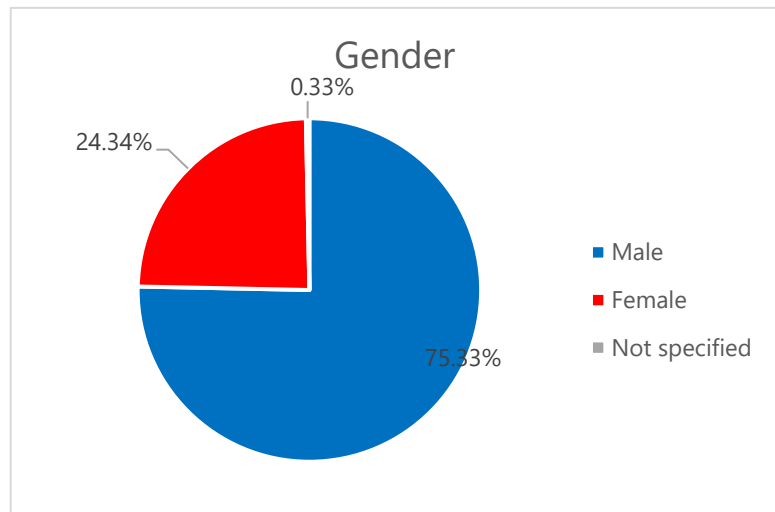
Result of Pre-training Questionnaire

Total number of answers: 304

General Information

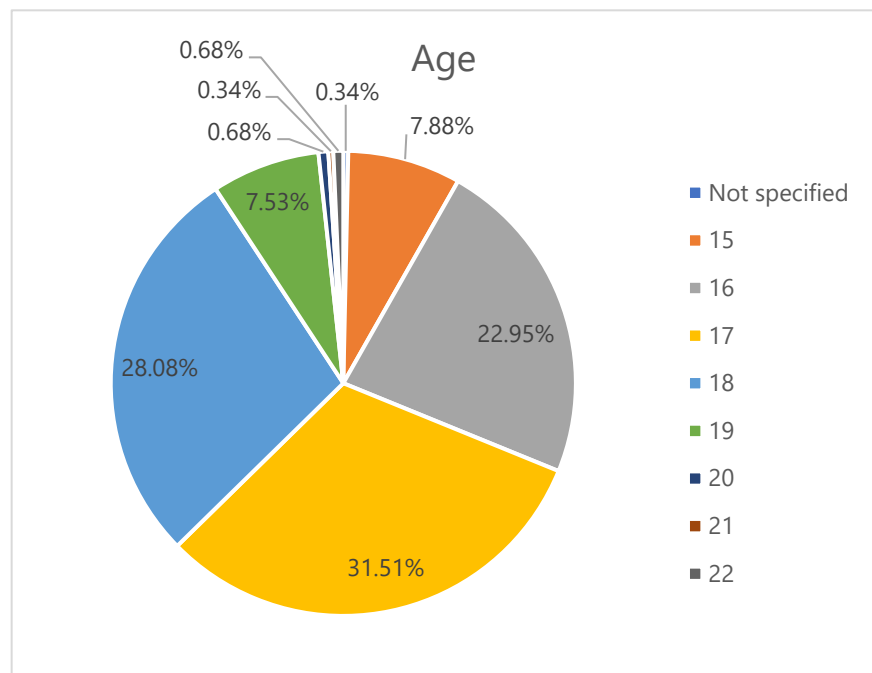
Gender

- Male: 229 (75.33%)
- Female: 74 (24.34%)
- Not specified: 1 (0.33%)



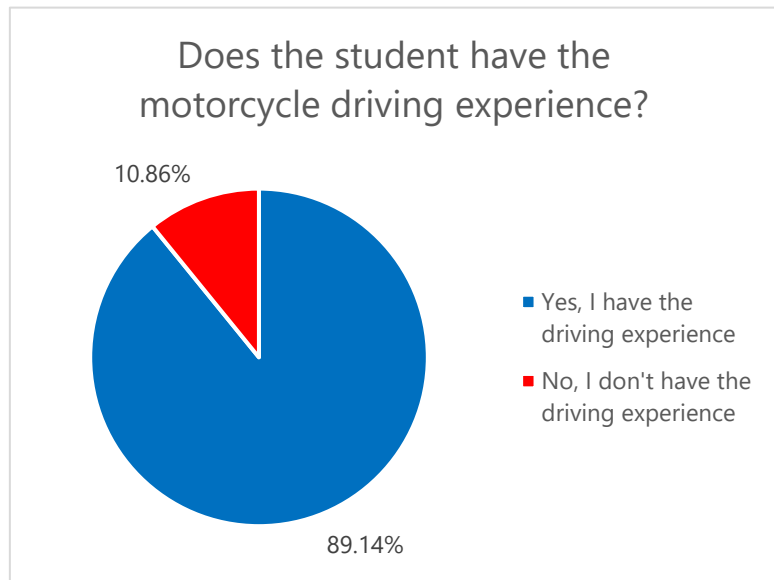
Age

- 15: 23 (7.88%)
- 16: 67 (22.95%)
- 17: 92 (31.51%)
- 18: 82 (28.08%)
- 19: 22 (7.53%)
- 20: 2 (0.68%)
- 21: 1 (0.34%)
- 22: 2 (0.68%)
- Not specified: 1 (0.34%)



Does the student have the motorcycle driving experience?

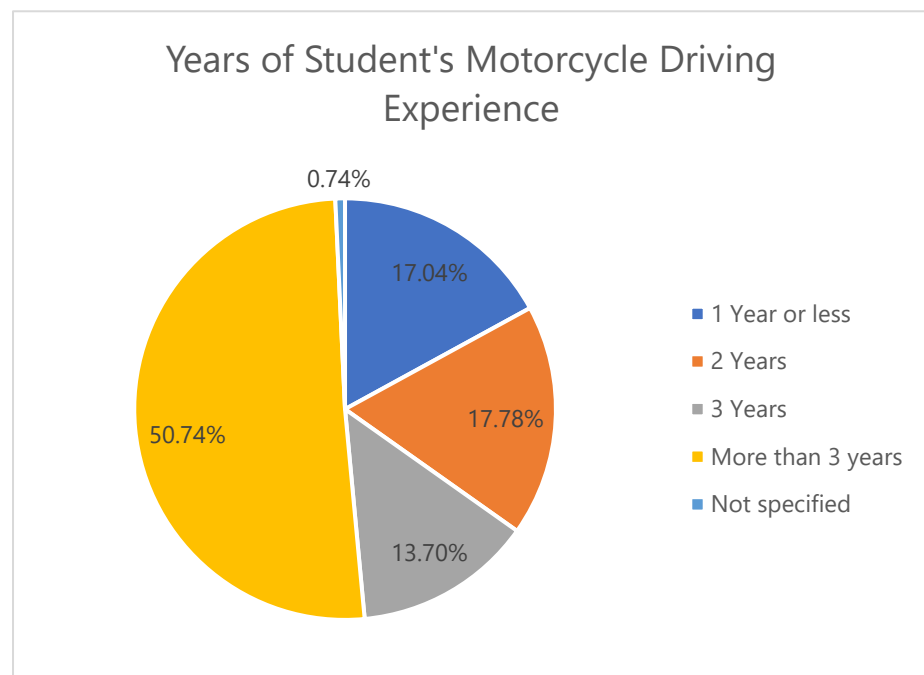
- Yes: 271 (89.14%)
- No: 33 (10.86%)



If yes, how many years of motorcycle driving experience do you have?

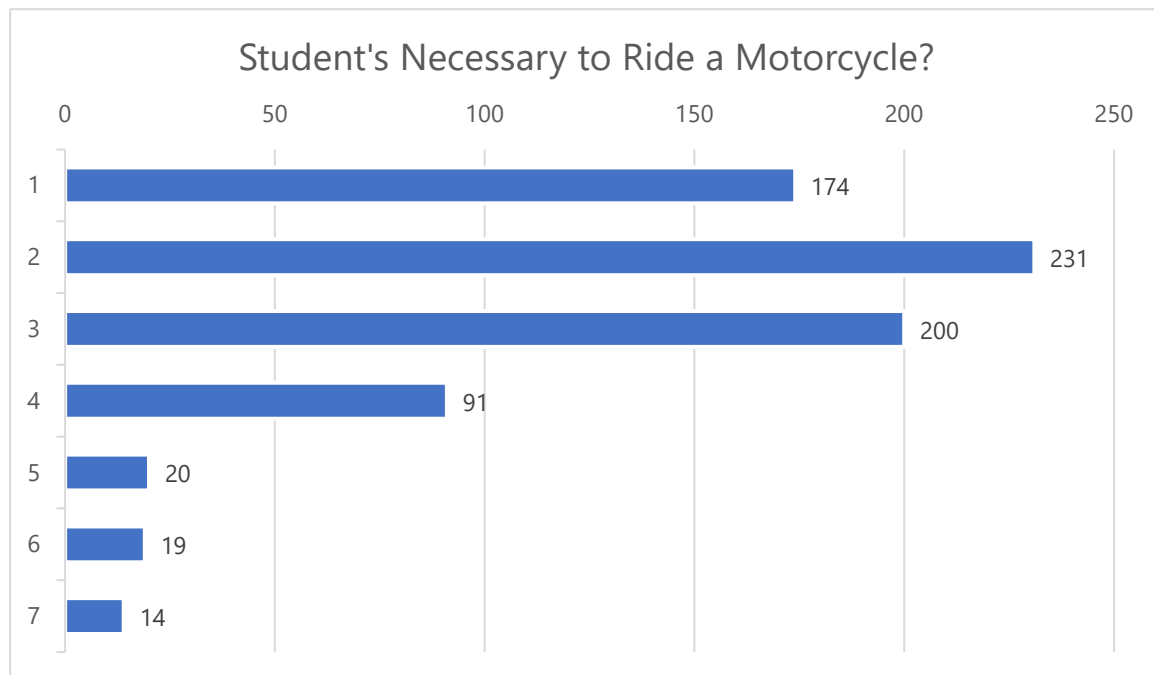
Answers of 270 students that have motorcycle driving experience are

- 1 Year or less: 46 (17.04%)
- 2 Years: 48 (17.78%)
- 3 Years: 37 (13.70%)
- More than 3 years: 137 (50.74%)
- Not specified: 2 (0.74%)



Part 1: Necessity of riding a motorcycle

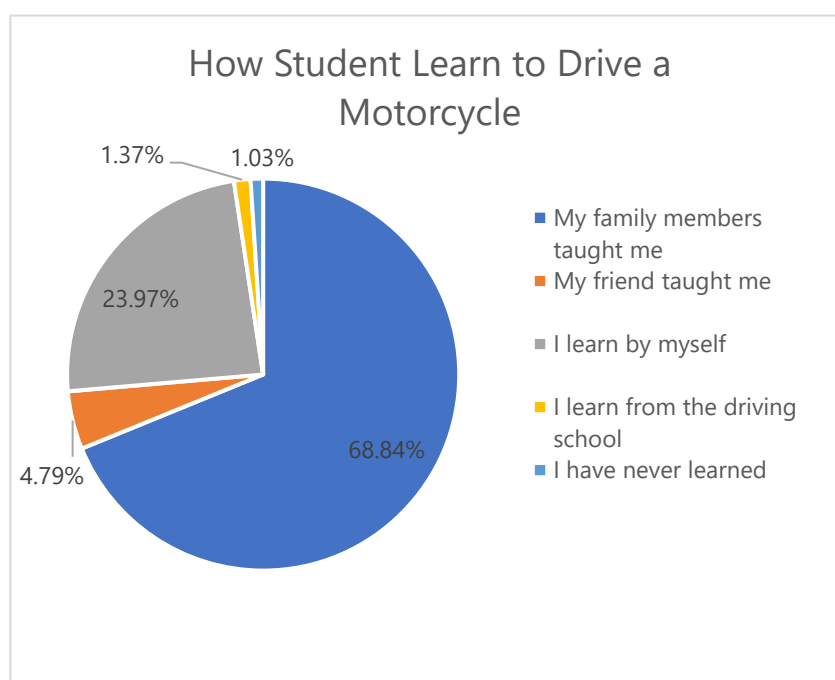
Question 1.1 Is it necessary for you to ride a motorcycle? [Can answer more than 1 choice]



- 174 students (57.24%) answered **1**: It is necessary to secure my family's income
- 231 students (75.99%) answered **2**: It is necessary for commuting to my school
- 200 students (65.79%) answered **3**: It is necessary to live in the neighborhood to play with friends, shopping, etc.
- 91 students (29.93%) answered **4**: It is necessary for long-distance travelling
- 20 students (6.58%) answered **5**: It is necessary to be cool or attractive to opposite sex
- 19 students (6.25%) answered **6**: It is unnecessary to ride a motorcycle because of the risks of traffic accidents
- 14 students (4.61%) answered **7**: No particular purpose

Part 2: Obtaining a driving license

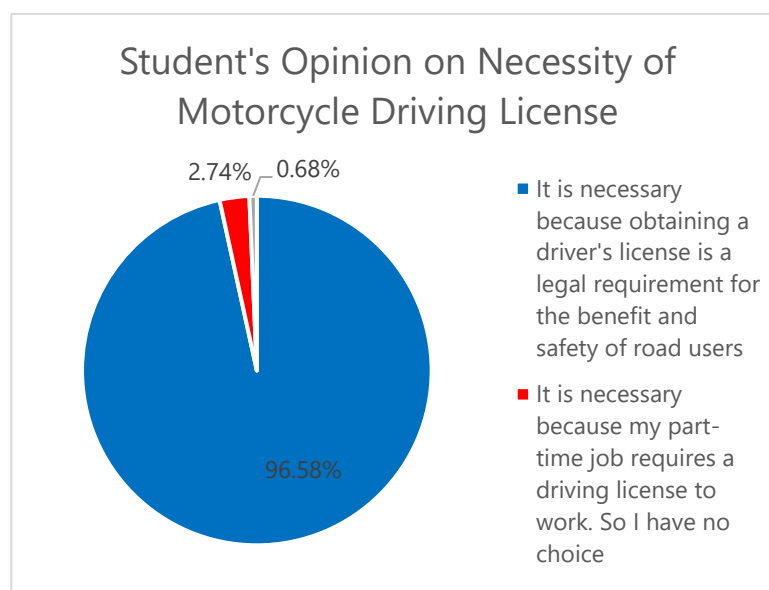
Question 2.1 How did you learn to drive a motorcycle?



- 201 students were taught by their family members (68.84%)
- 14 students were taught by their friend (4.79%)
- 70 students learned by themselves (23.97%)
- 4 students learned from the driving school (1.37%)
- 3 students have never learned how drive motorcycle (1.03%)

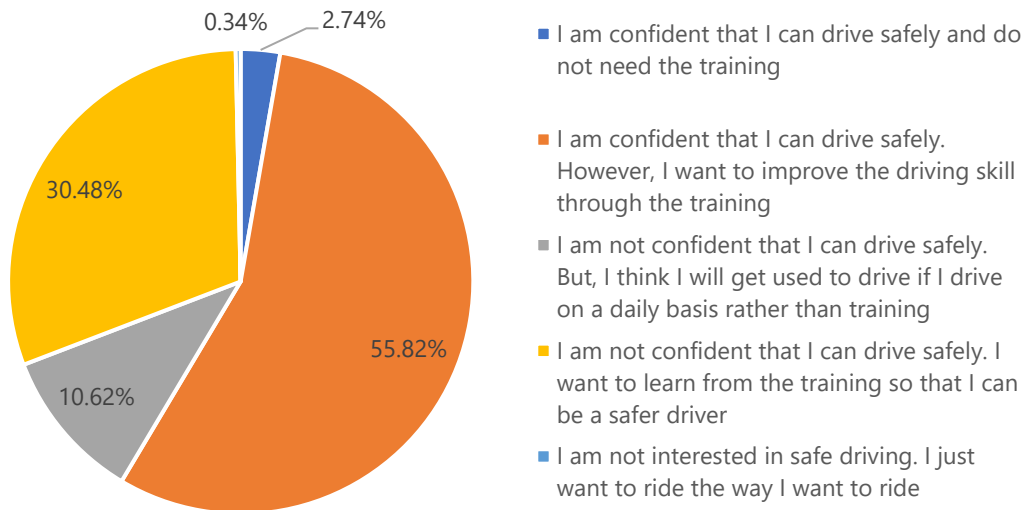
Question 2.2 Is it necessary for you to obtain a driving license for driving a motorcycle?

- 282 students answered that it is necessary due to the law and driver's benefits (96.58%)
- 8 students answered it is necessary due to their work regulation (8.74%)
- 2 students answered that they need to have driving license because their family asked them to apply for one (0.68%)



Question 2.3 Are you confident in driving a motorcycle safely?

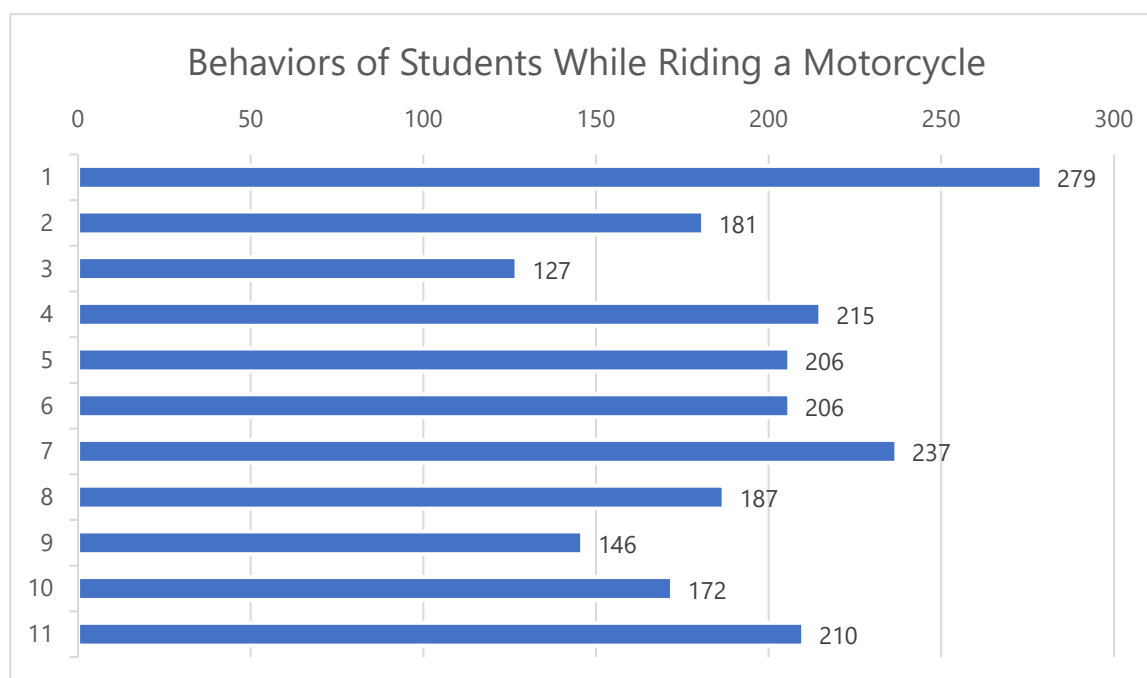
Student's Confidence in Motorcycle Safe Driving Skills



- 8 students answered that they are confident that they can drive safely and do not need the training. (2.74%)
- 163 students answered that they are confident they can drive safely but still want to improve their driving skills through the training. (55.82%)
- 31 students answered that they lack confidence in driving safely but think they will get used to driving if they drive daily rather than attend training. (10.62%)
- 89 students answered that they lack confidence in driving safely but want to learn from the training to become safer drivers. (30.48%)
- 1 student is uninterested in safe driving and only wants to ride however they want. (0.34%)

Part 3: Behavior of students while riding a motorcycle

Question 3.1 How do you behave when you ride a motorcycle? [Can answer more than 1 choice]

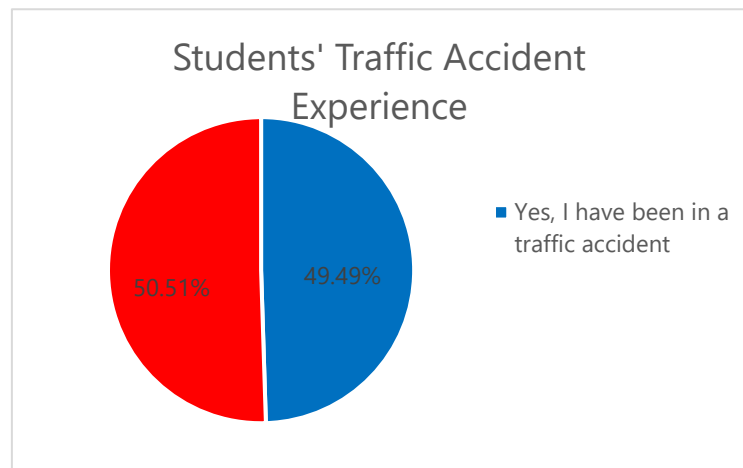


- 279 students answered **1**: Wear a helmet (91.78%)
- 181 students answered **2**: Wear long sleeve shirts and long pants (59.54%)
- 127 students answered **3**: Wear proper shoes, no sandals (41.78%)
- 215 students answered **4**: Keep driving on the left lane (70.72%)
- 206 students answered **5**: Do not drive on footpaths (67.76%)
- 206 students answered **6**: Obey speed limits (67.76%)
- 237 students answered **7**: Obey traffic signals (77.96%)
- 187 students answered **8**: No illegal modifications (e.g., no removal of rear-view mirrors, etc.) (61.51%)
- 146 students answered **9**: No two or more passengers (48.03%)
- 172 students answered **10**: Touch or look at smartphones only when stopping (56.58%)
- 210 students answered **11**: No drinking and No drugs (69.08%)

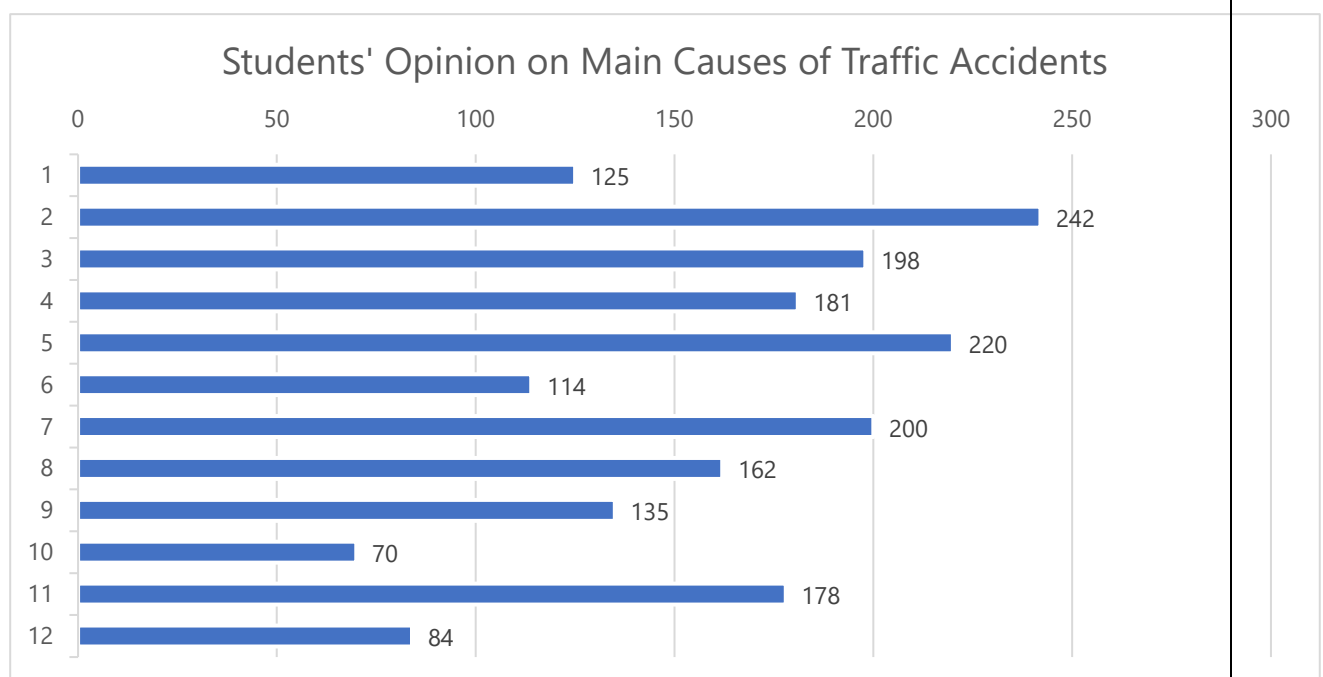
Part 4: About road traffic accidents

Question 4.1 Have you ever been in a traffic accident?

- Yes: 146 (49.49%)
- No: 149 (50.51%)



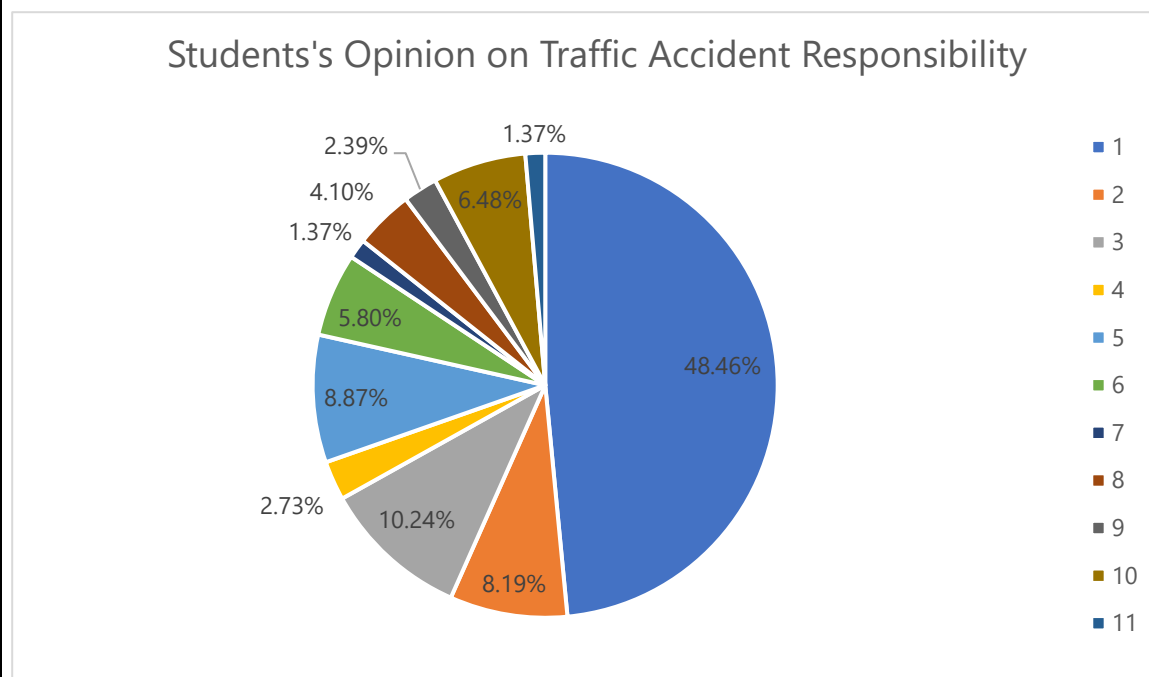
Question 4.3 From your experiences, which do you think is the main cause of severe road traffic accidents? [Can answer more than 1 choice]



- 125 students answered **1**: No driving license (41.12%)
- 242 students answered **2**: Drunk while driving (79.61%)
- 198 students answered **3**: Using a smartphone while driving (65.13%)
- 181 students answered **4**: Driving on footpaths or driving in the opposite direction (59.54%)
- 220 students answered **5**: Driving over the speed limit or ignoring traffic signals (72.37%)
- 114 students answered **6**: Riding a motorcycle at a young age (elementary and secondary school students) (37.50%)
- 200 students answered **7**: Not wearing helmets or removing rearview mirrors (65.79%)
- 162 students answered **8**: Sidesaddle riding on a motorcycle (53.29%)
- 135 students answered **9**: Bad footpaths or dangerous intersections (44.41%)
- 70 students answered **10**: No first aid for victims or emergency cars arriving late (23.03%)
- 178 students answered **11**: Lacking driving skills. Many drivers consider motorcycles will run if they just squeeze the throttles (58.55%)

- 84 students answered **12**: Traffic accidents are inevitable. It would be fates of the victims, and they should accept it (27.63%)

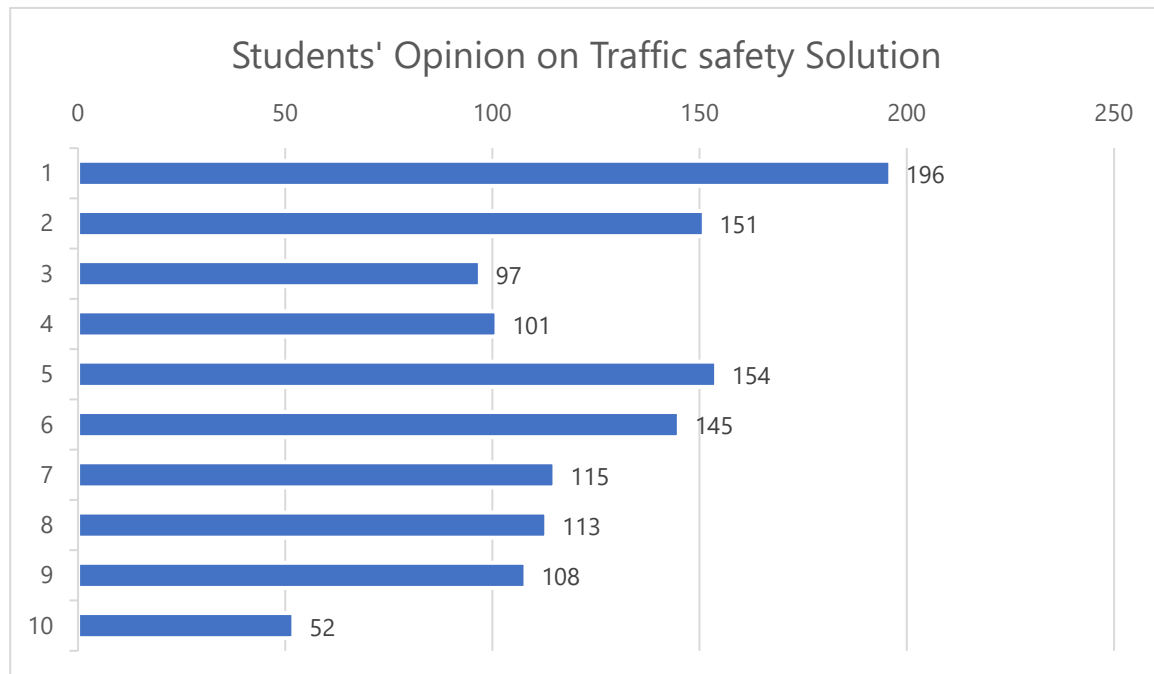
Question 4.4 Whose action do you think can encourage the safety for the road traffic accident the most?



- 142 students answered **1**: All road users follow traffic rules (48.46%)
- 24 students answered **2**: Traffic police enforce the traffic rules intensively (8.19%)
- 30 students answered **3**: Parents and schools oversee or monitor the motorcycle driving of their children or students (10.24%)
- 8 students answered **4**: Road agency ensures the road conditions are complete and safe (2.73%)
- 26 students answered **5**: Drunk drivers and unlicensed drivers are monitored intensively (8.87%)
- 17 students answered **6**: Young drivers drive more carefully, such as adhering to speed limits while driving (5.80%)
- 4 students answered **7**: Government conduct the campaign for road traffic safety (1.37%)
- 12 students answered **8**: Drivers train their driving skills to become more expert (4.10%)
- 7 students answered **9**: People near the accident scene assist or give first aid to traffic accident victims (2.39%)
- 19 students answered **10**: Drivers consider whether their readiness and driving ability are adequate or not before driving (6.48%)
- 4 students answered **11**: No one's actions will change the outcome; the accident was caused by unfortunate circumstances (1.37%)

Part 5: About traffic safety

Question 5.1 Which actions do you think are necessary for traffic safety? [Can answer more than 1 choice]



- 196 students answered **1**: Traffic accidents are caused by people, and we can prevent them with our efforts (64.47%)
- 151 students answered **2**: Traffic violators must be exposed by traffic police officers strictly. Repeat offenders should be punished severely (49.67%)
- 97 students answered **3**: Parents and schools who allow their children to drive motorcycles must consider another way not to drive motorcycles anymore (31.91%)
- 101 students answered **4**: Road construction should consider the usage of local people, not to make them drive in opposite directions or to prevent dangerous intersections (33.22%)
- 154 students answered **5**: Motorcycle driving training course should be extended widely for every high school student (50.66%)
- 145 students answered **6**: Additional driving skills training for drivers should be widely implemented (47.70%)
- 115 students answered **7**: Community people should cooperate and extend traffic safety activities (37.23%)
- 113 students answered **8**: Young people should lead traffic safety activities for future society (37.17%)
- 108 students answered **9**: Government should extend traffic safety activities for driving safety and traffic safety (35.53%)
- 52 students answered **10**: As long as I, my family, and my friends don't cause or get involved in traffic accidents. It doesn't matter (17.11%)

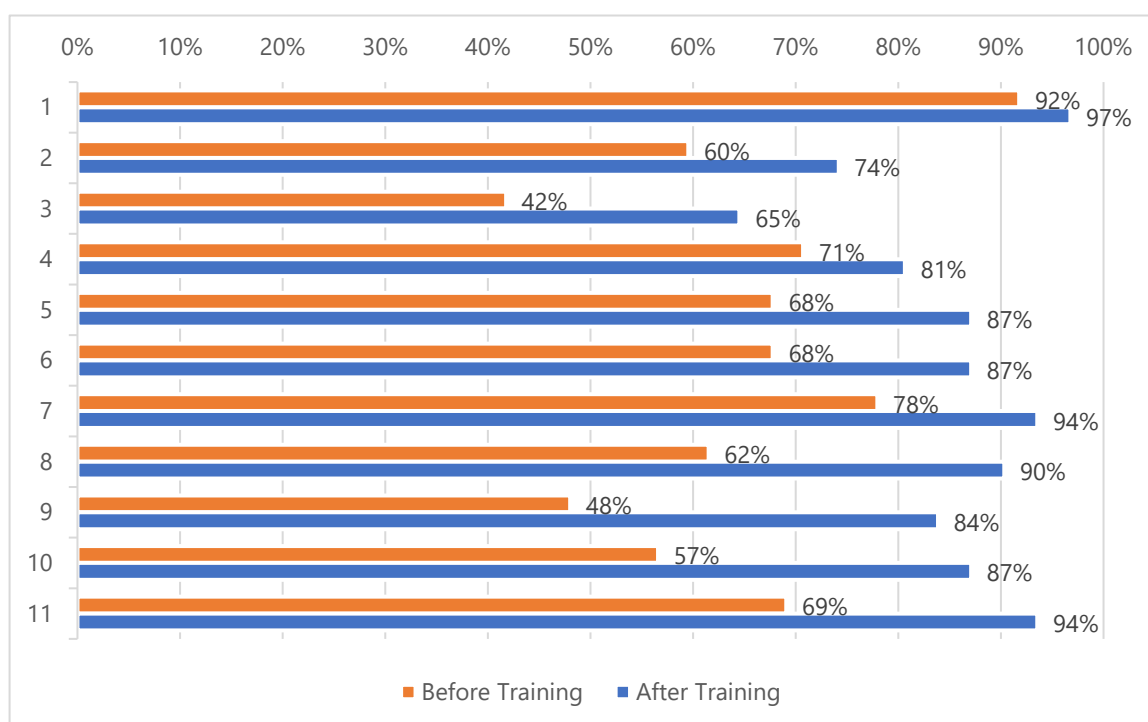
ii) Post-training Survey

On March 20, the teachers in charge at each school distributed the questionnaire to the training course participants through the regional DLT offices. However, due to the passage of time and the students' waning interest, combined with the onset of the graduation season by the end of March, only 31 responses were collected. Given the limited responses, the number of responses to each question is shown on the following pages. The results are summarized below.

- (a) Approximately half of the students who lacked confidence in their safe driving abilities gained confidence through this training course and the rest who were already confident reported improvement in their safe driving abilities. Furthermore, eight students desired further training.
- (b) Most students reported overall improvement in their driving behavior.
- (c) Regarding various risks associated with traffic accidents, 20 students understood these risks, although some had a lower level of understanding.
- (d) On the topic of insurance, 20 students wanted to enroll for insurance, but 4 found it financially burdensome, and 6 found it unnecessary.
- (e) Nineteen students understood the effectiveness and necessity of helmets, while 10 did not fully comprehend.

Based on these findings, the changes in driving behavior described in item (b) are analyzed as follows.

Project Completion Report



Source: JET

Figure 7.3.24 Changes in Students' Behavior Before and After the Training

Table 7.3.2 Summary of Changes in Students' Behavior before and after the Training

Number	Behavior	Before Training (%)	After Training (%)	Incremental (%)	Rate of Increase (%)
1	Wear a helmet	92	97	5	5
2	Wear long sleeve shirts and long pants	60	74	14	23
3	Wear proper shoes, no sandals	42	65	23	55
4	Keep driving on the left lane	71	81	10	14
5	Do not drive on footpath	68	87	19	28
6	Obey speed limits	68	87	19	28
7	Obey traffic signals	78	94	16	21
8	No illegal modifications (e.g. no removal of rear-view mirrors, etc.)	62	90	28	45
9	No two or more passengers	48	84	36	75
10	Touch or look at smartphones only when stopping	57	87	30	53
11	No drinking and No drugs	69	94	25	36

These changes in behavior are categorized into four groups. The reasons for the changes are analyzed.

(a) Items with a high compliance rate before the training (90% or higher)

1: Helmet-wearing: 92% → 97%, 5% increase, 5% increase rate

→ Helmet-wearing is strongly encouraged in many places, including schools, and even before obtaining a license, students were aware of and practiced helmet-wearing (denoting helmet-wearing campaigns have achieved a certain level of success.)

→ Additionally, the training course helped students understand the necessity of wearing helmets, including the rationale behind it, resulting in more wearing helmets after the training course.

(b) Items with a moderate compliance rate before the training (70%–90%)

7: Obeying traffic signals: 78% → 94%, 16% increase, 21% increase rate

4: Driving on the left side 71% → 81%, increase of 10%, increase rate of 14%

→ students learned fundamental traffic rules likely from their families or friends (even if they were unlicensed drivers) when they initially learned how to operate motorcycles.

→ The students understood further the necessity of complying with these basic traffic rules, including the rationale behind them, through this training course. More students began obeying these rules after the training course.

(c) Items with a low compliance rate before the training (50%-70%)

11: No drunk or drugged driving 69% → 94%, 25% increase, 36% increase rate

5: No driving on sidewalks 68% → 87%, increase of 19%, increase rate of 28%

6: Complying with speed limits 68% → 87%, increase of 19%, increase rate of 28%

8: No illegal modifications 62% → 90%, increase of 28%, increase rate of 45%

2: Wearing long-sleeved shirts and long pants 60% → 74%, increase of 14%, increase rate of 23%

10: Using smartphones only when stopped 57% → 87%, increase of 30%, increase rate of 53%

→ These items were not commonly known to students when they learned how to operate motorcycles from their families or on their own, likely because many of the surrounding people were unlicensed drivers.

→ It is assumed that many students learned about these regulations for the first time during the training course, understood the necessity of complying with these traffic rules, including the rationale behind them, and achieved a high compliance rate of over 80% after the training course. This indicates the high effectiveness of the training course.

→ Especially the increased awareness of drunk and drugged driving through the training course can be seen as the first step towards a broader societal rejection of such behaviors. The young drivers who attended the training course are expected to become key drivers in future campaigns to eradicate drunk and drugged driving.

→ The increase in wearing long-sleeved shirts and long pants was smaller compared to other items. While essential for preventing injuries or mitigating symptoms in case of falls, this practice is also influenced by individual lifestyle habits, making significant improvements difficult. Nonetheless, many students changed their behavior through the training course, indicating its effectiveness.

(d) Items with a very low compliance rate before the training (below 50%)

9: No triple riding 48%→84%, 36% increase, 75% increase rate

3: Wearing shoes instead of sandals 42% → 65%, increase of 23%, increase rate of 55%

→ It is assumed that many students heard about these items for the first time during the training course and changed their driving behavior accordingly. The significant increase in compliance with the triple-riding ban from 48% to 84% and the increase rate of 75% indicates the training's considerable impact.

→ Although the compliance rate for wearing shoes instead of sandals

(required for foot and ankle protection during normal stops and falls) was only 65% after the training course, the increase of 23% and increase rate of 55% indicate significant improvement. Like wearing long-sleeved shirts and long pants, this practice is also influenced by individual lifestyle habits.

Based on the above analysis, it is clear that the safe driving training courses for high school students not only promote the acquisition of driving licenses but also significantly improve their awareness of safe driving practices.

However, it is difficult to demonstrate the training' impact on reducing the number of fatal traffic accidents among high school students based solely on these results (Despite an estimate that the injury and fatality rate of training course participants is less than one-fourth, it is currently difficult to derive statistically significant figures from the available data.).

Nevertheless, considering that the DLT has been conducting training courses for 30,000 participants annually and aims to expand participation in the future, it is evident that continuing to improve the traffic safety awareness of more high school students through this long-term program will eventually lead to these experienced young motorcyclists becoming the mainstream and dramatically improving the traffic safety situation in the country.

Based on these results, the following considerations are proposed to enhance future training courses:

- (a) Both theoretical and practical training courses are limited in time, necessitating an extension of the training hours and an enrichment of the content. Specifically, the training courses should help students realize that "their safe driving abilities are still inadequate, continuous learning is necessary, and they need to practice cautious driving to compensate for this."

It is especially important to include training on hazard prediction and avoidance (emergency braking and avoidance), which are not fully

covered in the current theoretical and practical training.

- (b) Since high school students are expected to behave as responsible members of the traffic society, they need to gain sufficient knowledge through theoretical training about the various risks associated with traffic accidents and the role and details of insurance.
- (c) Regarding helmets, it is suspected that some students wear them merely because they are told to wear helmets. The theoretical training should ensure that students understand the effectiveness and limitations of helmets, while the practical training should teach the differences between helmet types and the correct way to fasten the chin strap securely.
- (d) Up to now, the DLT has used the number of driving license recipients as the evaluation indicator for this program. It is proposed that in the future, changes in students' awareness of traffic safety should also be monitored as an evaluation indicator. The monitoring results can be used to evaluate the program and the content of the training courses, providing necessary data for program improvements.

Furthermore, the monitoring results are expected to serve as valuable baseline data for formulating and implementing future traffic safety policies by the DLT based on the traffic safety awareness of the younger generation.

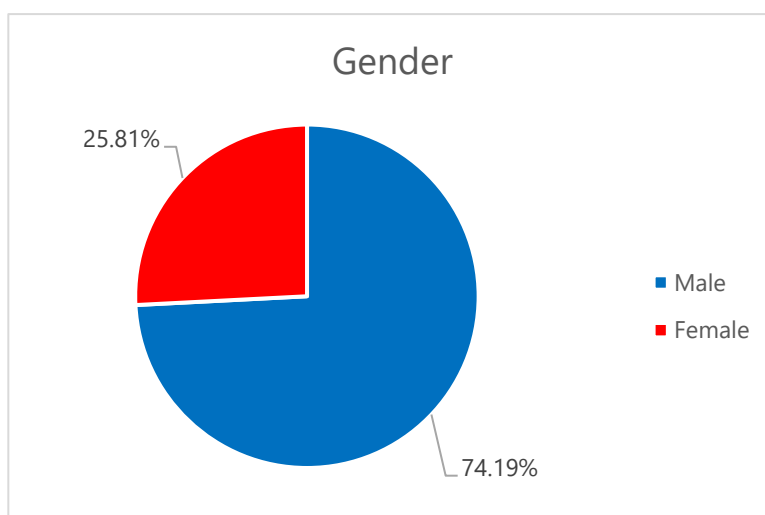
Result of Post-training Questionnaire

Total number of answers: 31

Part 1: General Information

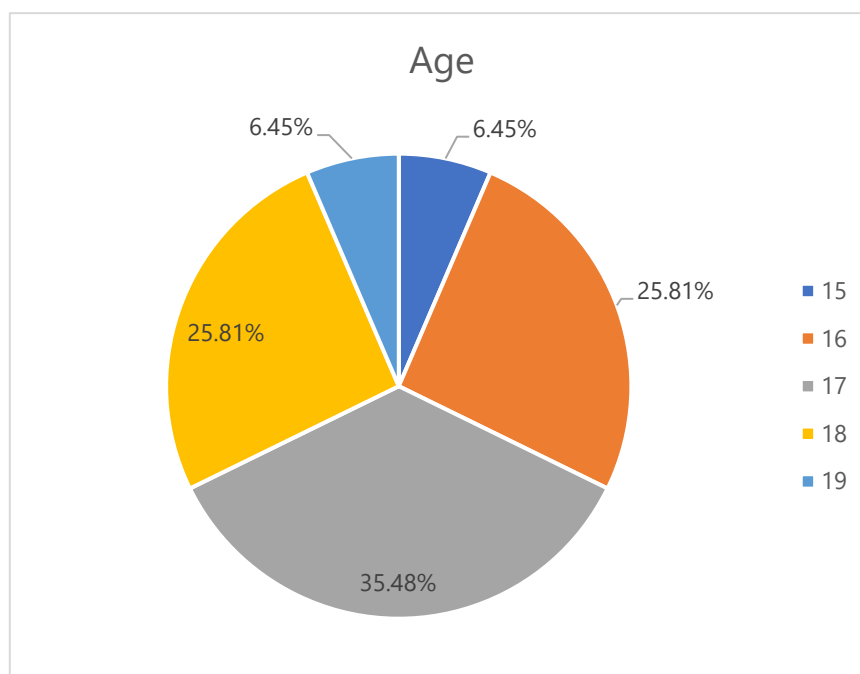
1.1 Gender

- Male: 23 (74.19%)
- Female: 8 (25.81%)



1.2 Age

- 15: 2 (6.45%)
- 16: 8 (25.81%)
- 17: 11 (35.48%)
- 18: 8 (25.81%)
- 19: 2 (6.45%)

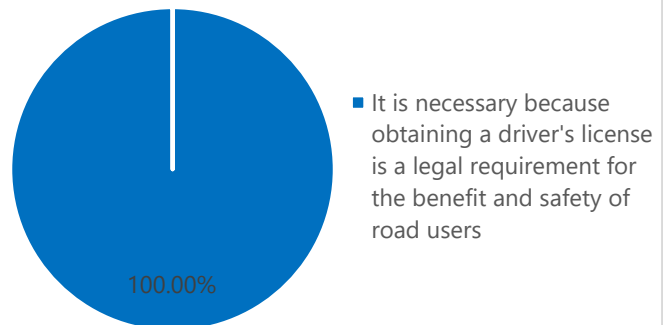


Part 2: Obtaining a Driving License

Question 2.1 Is it necessary to obtain a driving license?

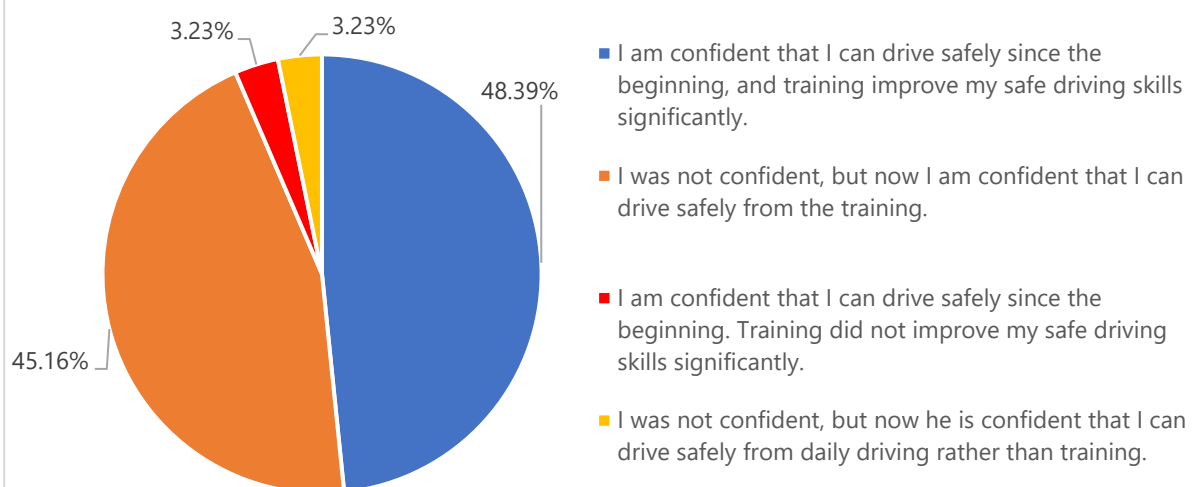
- All 31 students answered that it is necessary due to the law & driver's benefits (100%)

Student's Opinion on Necessity of Motorcycle Driving License



Question 2.2 Do you understand how to drive safely from the training?

Student's Confidence in Motorcycle Safe Driving Skills

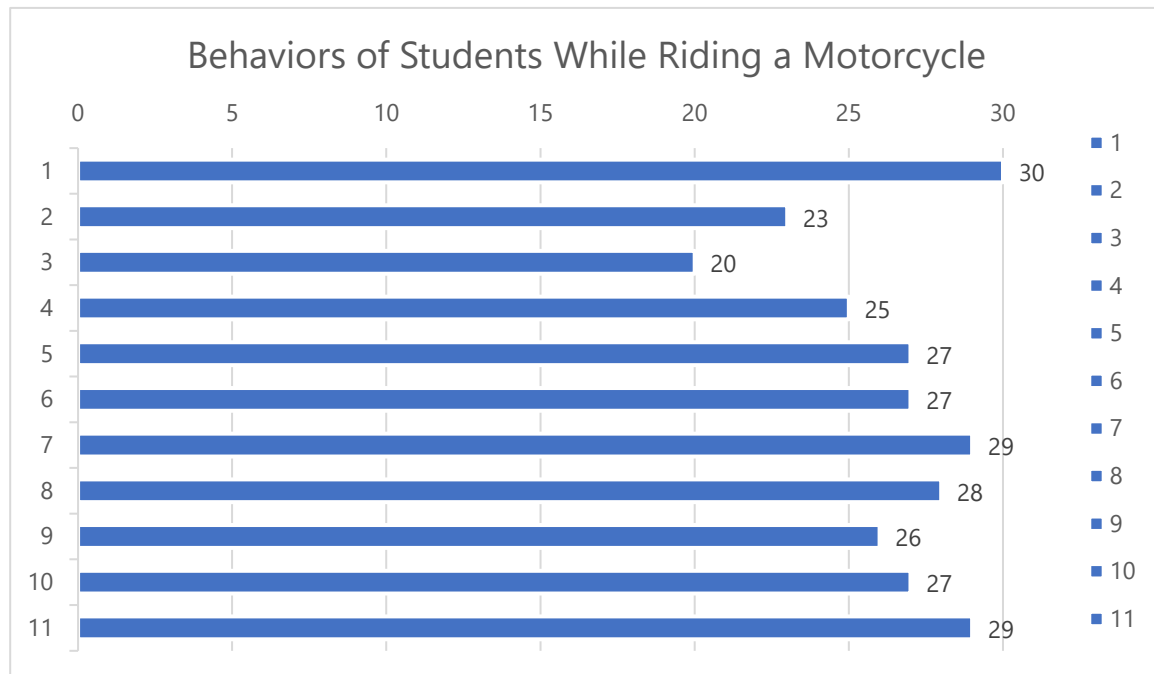


- 15 students answered that they were confident that they could drive safely from the beginning, and the training improved their safe driving skills significantly. (48.39%)
- 14 students answered that they were not confident in driving safely, but they do now after the training. (45.16%)
- 1 student answered that he has been confident in his safe driving from the beginning. Training did not significantly improve his safe driving skills. (3.23%)
- 1 student answered he was not confident initially but now feels confident he can drive safely in his daily driving rather than attend training. (3.23%)

More than 90% of the students who participated in the training answered positively that it significantly improved their motorcycle safe driving skills.

Part 3: Behavior of Driving a Motorcycle

Question 3.1 How do you behave when driving a motorcycle in the period of one month after training? [Can answer more than 1 choice]



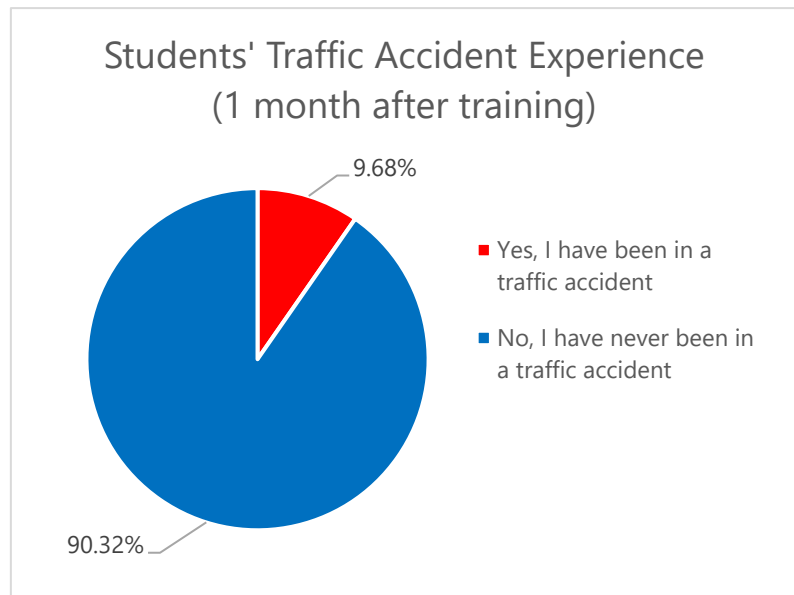
- 30 students answered **1**: Wear a helmet (96.77%)
- 23 students answered **2**: Wear long sleeve shirts and long pants (74.19%)
- 20 students answered **3**: Wear proper shoes, no sandals (64.52%)
- 25 students answered **4**: Keep driving on the left lane (80.64%)
- 27 students answered **5**: Do not drive on footpaths (87.10%)
- 27 students answered **6**: Obey speed limits (87.10%)
- 29 students answered **7**: Obey traffic signals (93.55%)
- 28 students answered **8**: No illegal modifications (e.g., no removal of rear-view mirrors, etc.) (90.32%)
- 26 students answered **9**: No two or more passengers (83.87%)
- 27 students answered **10**: Touch or look at smartphones only when stopping (87.10%)
- 29 students answered **11**: No drinking and No drugs (93.55%)

In addition, 19 students strictly follow all safe driving behavior guidelines. (61.29%)

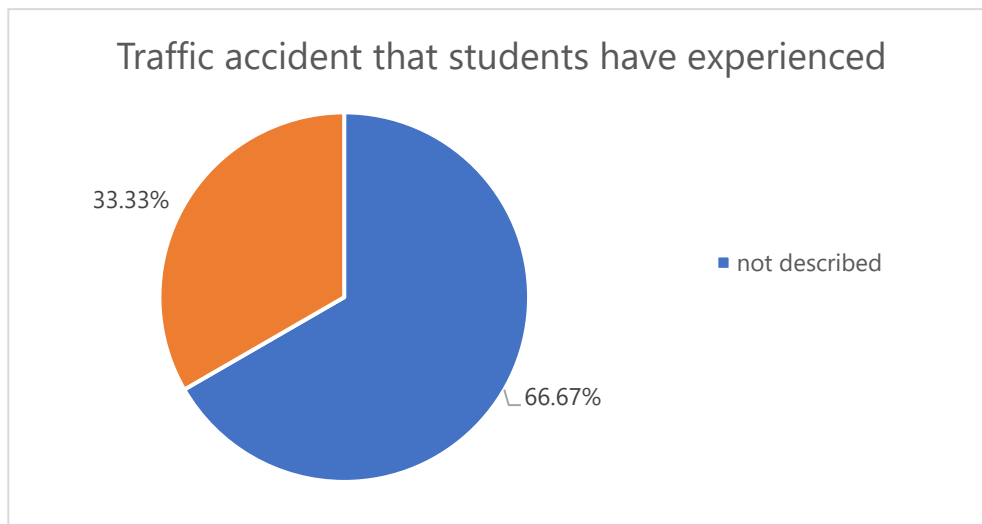
Part 4: About Road Traffic Accidents

Question 4.1 Have you been involved in traffic accidents in the period of one month after training?

- Yes: 3 (9.68%)
- No: 28 (90.32%)



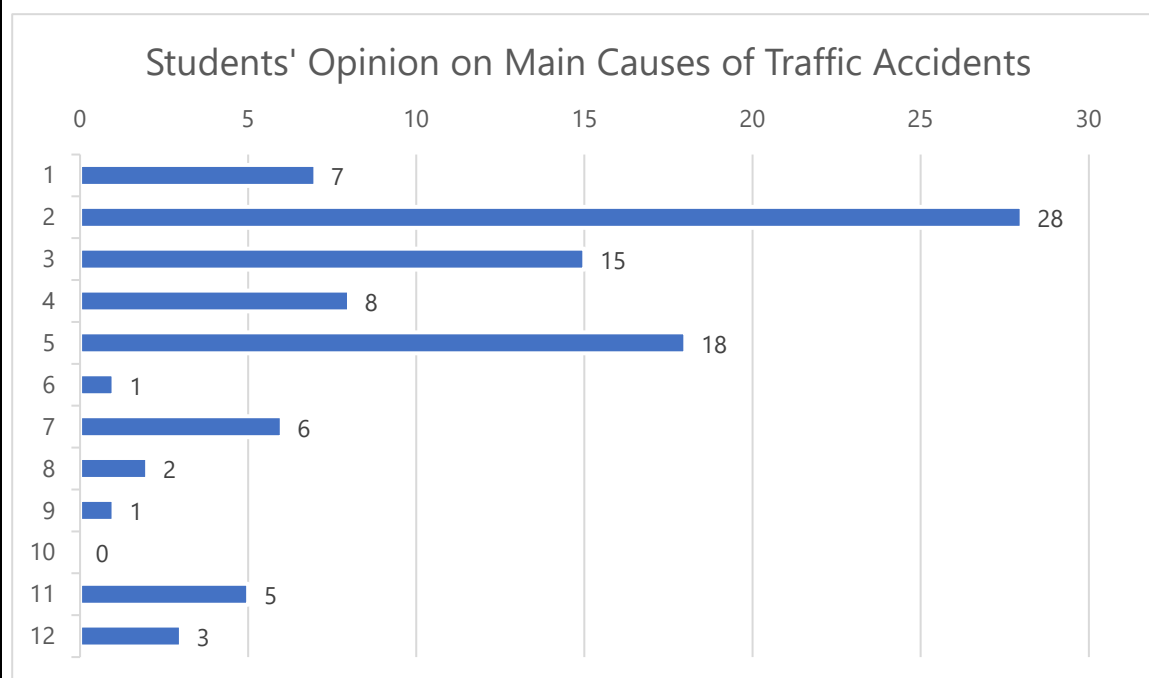
Question 4.2 If you have been involved in a traffic accident, please provide a brief description of the incident.



Three traffic accidents involved students a month after training.

- Two cases have no description (66.67%)
- One is a case of falling asleep from drowsiness (33.33%)

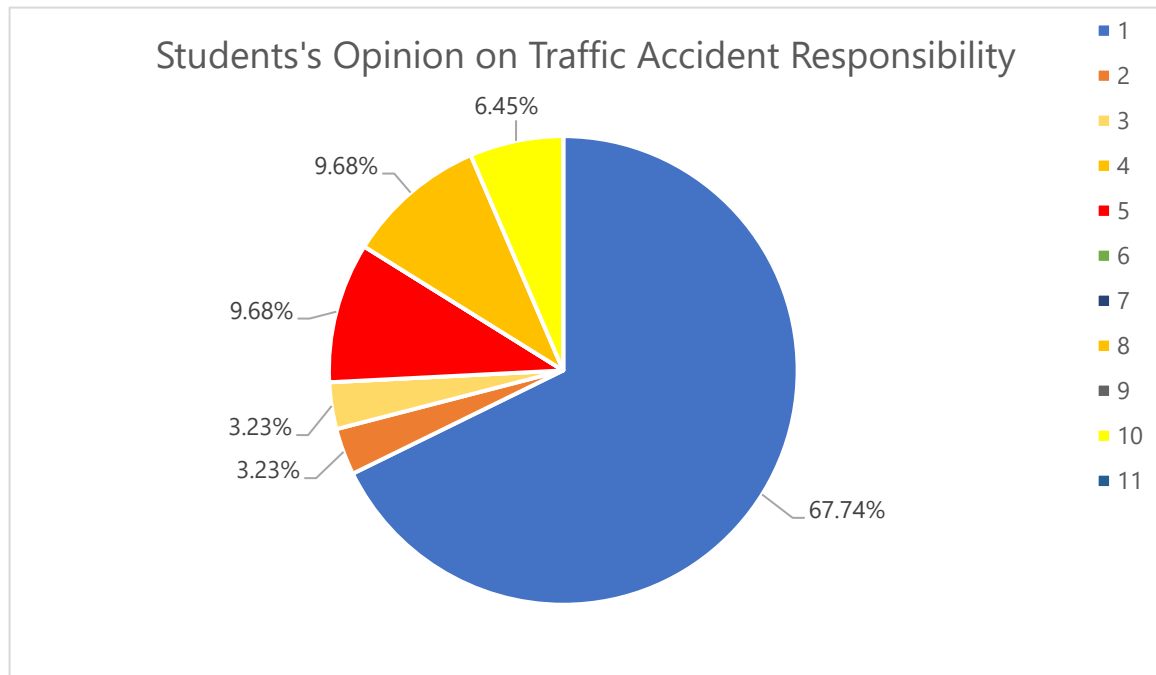
Question 4.3 After training, do you think what are main causes of traffic accidents? [Can answer more than 1 choice]



- 7 students answered **1**: Unlicensed driving (22.58%)
- 28 students answered **2**: Drunk driving (90.32%)
- 15 students answered **3**: Using a smartphone while driving (48.38%)
- 8 students answered **4**: Driving on footpaths or driving in opposite directions (25.81%)
- 18 students answered **5**: Over speeding or ignoring traffic signals (58.06%)
- 1 student answered **6**: Riding a motorcycle at a young age (elementary and secondary school students) (3.22%)
- 6 students answered **7**: Not wearing helmets or removing rearview mirrors (19.35%)
- 2 students answered **8**: Sidesaddle riding on a motorcycle (6.45%)
- 1 student answered **9**: Bad pavement or dangerous structures of intersections (3.22%)
- No student answered **10**: No first aid for victims or late coming of emergency cars (0.00%)
- 5 students answered **11**: Lack of driving skills. A lot of drivers just consider motorcycles will run if they just squeeze the throttles (16.13%)
- 3 students answered **12**: Traffic accidents are inevitable. It would be the fates of the victims, and they should be accepted (9.68%)

Most students think that the three main causes of traffic accidents are drunk driving (90.32%), followed by speeding or ignoring traffic signals (58.06%), and using a smartphone while driving (48.38%). All causes of traffic accidents, in students' opinion, are human factors.

Question 4.4 After training, do you think who are most responsible for traffic accidents?

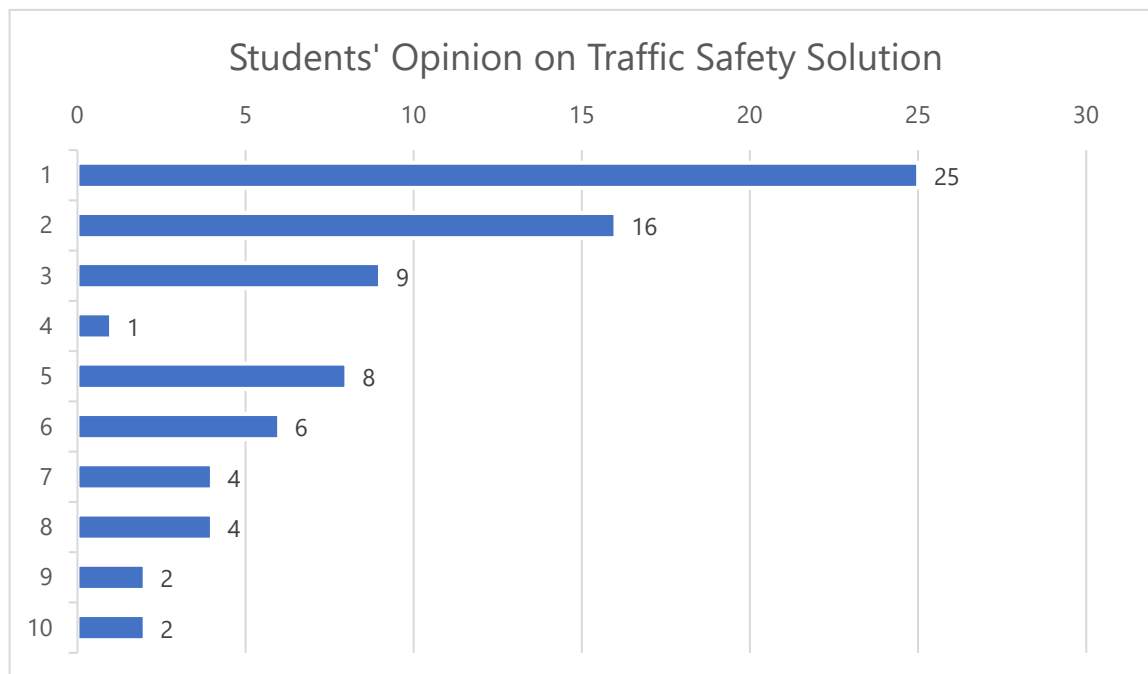


- 21 students answered **1**: All road users (67.74%)
- 1 student answered **2**: Traffic police officers, who don't seem to expose the traffic violators (3.22%)
- 1 student answered **3**: Parents and schools allow their children to drive motorcycles (3.22%)
- No student answered **4**: The road agency ensures the road conditions are complete and safe (0.00%)
- 3 students answered **5**: Adults, who allow drunk driving and unlicensed driving in the society (9.68%)
- No student answered **6**: Young drivers drive more carefully, such as adhering to speed limits while driving (0.00%)
- No student answered **7**: Government conduct the campaign for road traffic safety (0.00%)
- 3 students answered **8**: Motorcycle drivers who have poor driving skills and cause traffic accidents (9.68%)
- No student answered **9**: People near the accident scene provide assistance or first aid to traffic accident victims (0.00%)
- 2 students answered **10**: Drivers who lack enough driving ability (6.45%)
- No student answered **11**: No one's actions will change the outcome; the accident was caused by unfortunate circumstances (0.00%)

Part 5: About Traffic Safety

Question 5.1 After training, do you think what are necessary actions for traffic safety?

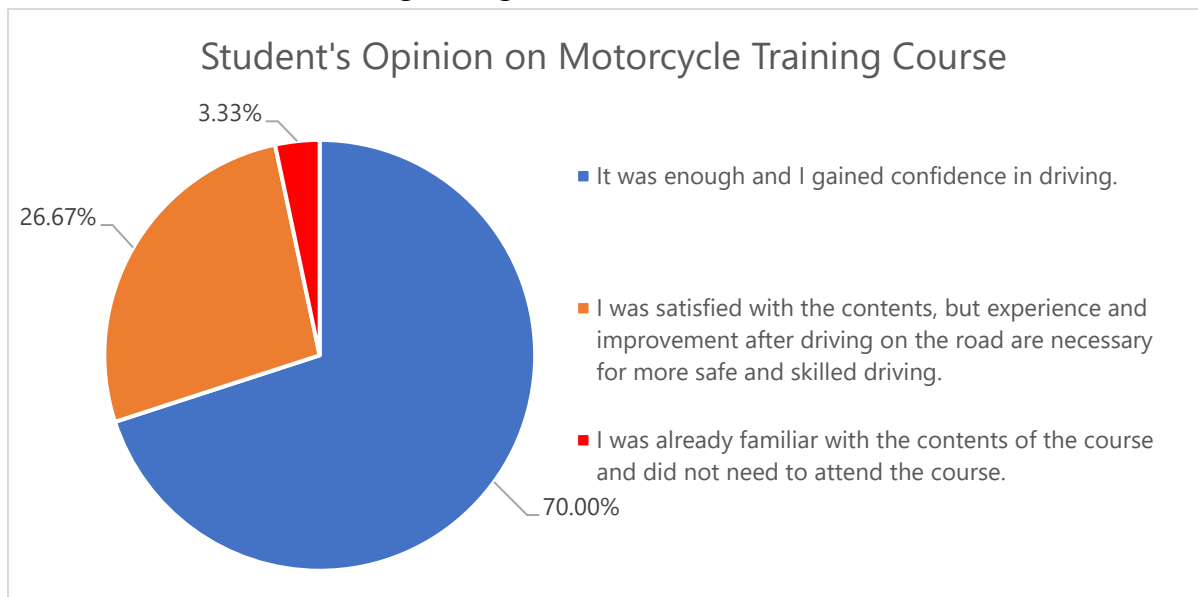
[Can answer more than 1 choice]



- 25 students answered **1**: Traffic accidents are caused by people, and we can prevent them with our efforts (80.64%)
- 16 students answered **2**: Traffic violators must be exposed by traffic police officers strictly. Repeat offenders should be punished severely (51.61%)
- 9 students answered **3**: Parents and schools who allow their children to drive motorcycles must consider another way not to drive motorcycles anymore (29.03%)
- 1 student answered **4**: Road construction should consider the usage of local people, not make them drive in opposite directions or prevent dangerous intersections (3.22%)
- 8 students answered **5**: Motorcycle driving training course should be extended widely for every high school student (25.81%)
- 6 students answered **6**: Additional driving skills training for drivers should be widely implemented (19.35%)
- 4 students answered **7**: Community people should cooperate and extend traffic safety activities (12.90%)
- 4 students answered **8**: Young people should lead traffic safety activities for future society (12.90%)
- 2 students answered **9**: Government should extend traffic safety activities for driving safety and traffic safety (6.45%)
- 2 students answered **10**: As long as I, my family, and my friends don't cause or get involved in traffic accidents, it doesn't matter (6.45%)

Part 6: Motorcycle Skill Training Course

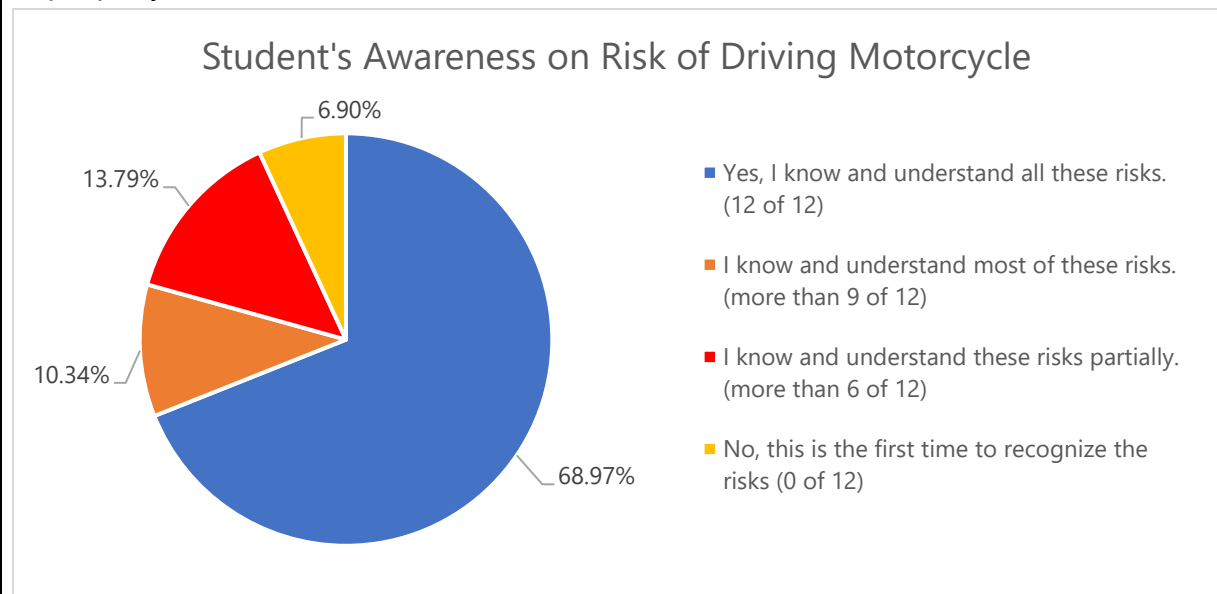
Question 6.1 Was the training enough?



- 21 students answered that it was enough, and they gained confidence in driving. (70.00%)
- 8 students answered that they were satisfied with the contents, but experience and improvement after driving on the road are necessary for safer and skilled driving. (26.67%)
- 1 student answered that he was already familiar with the contents of the course and did not need to attend the course. (3.33%)

More than 95% of the students who participated in the training answered positively that the training contents satisfy their demand. Some of these students answered that they expected more driving experience.

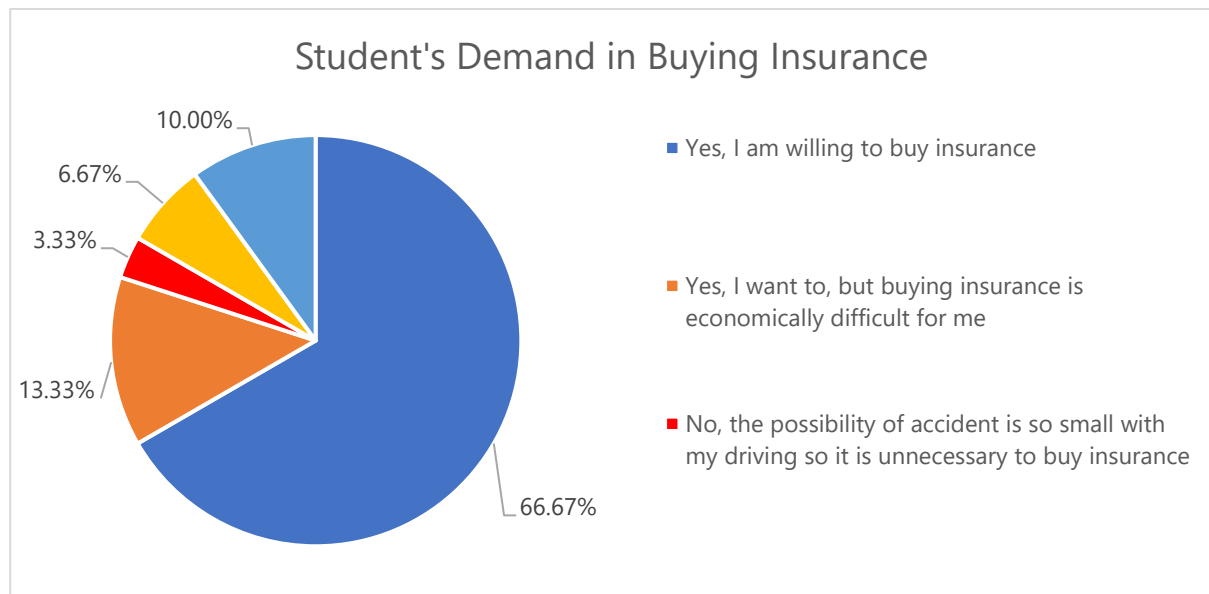
Question 6.2 Do you know the severity from the accident if you driving motorcycle improperly?



- 20 students answered that they know and understand all these risks. (12 of 12) (68.97%)
- 3 students answered that they know and understand most of these risks. (more than 9 of 12) (10.34%)
- 4 students answered that they know and understand these risks partially. (more than 6 of 12) (13.79%)
- 2 students answered that this is the first time for them to recognize the risks (0 of 12) (6.90%)

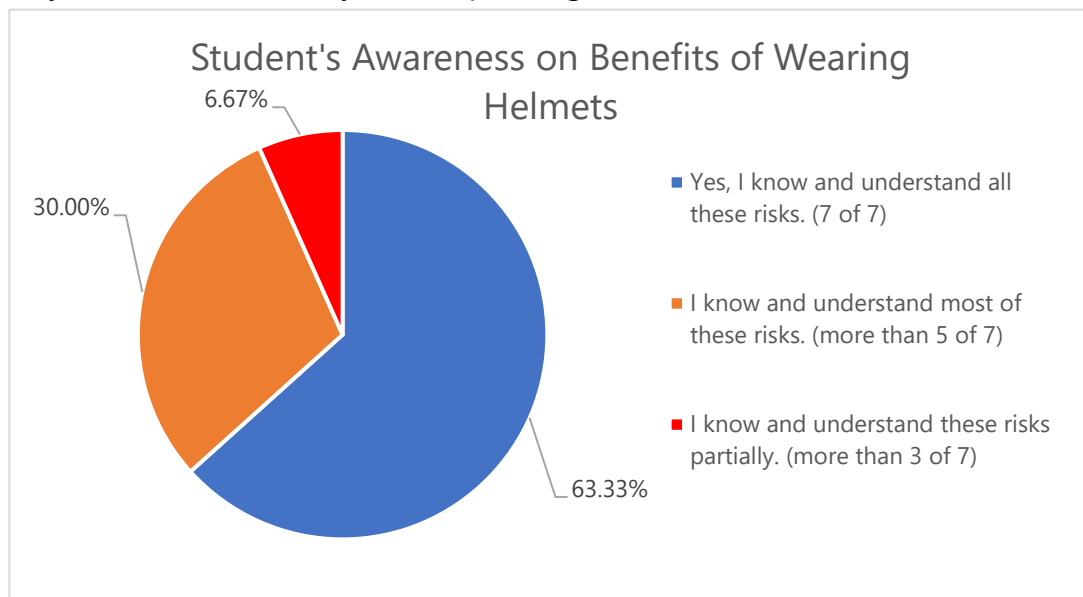
More than 90% of the students in the training answered positively. They were aware of the risks of driving a motorcycle.

Question 6.3 Do you want to buy insurance after acknowledge these risks from the accident?



- 20 students answered that they want and are ready to have insurance. (66.67%)
 - 4 students answered that they want to, but buying insurance is economically difficult for them. (13.33%)
 - 1 student answered that the possibility of an accident is so small with his driving that buying insurance is unnecessary. (3.33%)
 - 2 students answered that they don't care about such risks. They can't drive a motorcycle if they think about the risks. (6.67%)
 - 3 students answered that accident victims should return to their hometowns and have their families support them; the insurance system does not fit into traditional Thai society. (10.00%)
- 80% of the students in the training positively answered that they want to buy accident insurance.

Question 6.4 Do you know the benefits of wearing helmets when you drive a motorcycle or ride a motorcycle as a passenger?



- 19 students answered that they know and understand all these risks (7 of 7). (63.33%)
- 9 students answered that they know and understand most of these risks (more than 5 of 7). (30.00%)
- 2 students answered that they know and understand these risks partially (more than 3 of 7). (6.67%)

(4) Proposals for Further Improvement of Safe Driving Training for High School Students

1) Setting Strategic Goals

Many traffic safety promotion projects depend on the implementation of measures by third parties, such as enhanced enforcement by traffic police and the streamlining and acceleration of judicial processes by legal professionals. Among these, safe driving training for high school students is a program that the DLT can implement proactively without being influenced by such external conditions, and although it takes time, it can achieve high effectiveness.

On the other hand, considering that the current scale of the project, which involves about 30,000 participants annually, places a significant burden on the DLT despite its high effectiveness, it is essential to set strategic goals when considering the scale and implementation methods of the program, taking into account the resources available to the DLT.

Setting these strategic goals involves determining the number of participants (with a gradual expansion of the target population, ultimately aiming to train 600,000 out of the approximately 850,000 15-year-olds annually) and establishing the necessary funding, organization, personnel, implementation methods, and public relations strategies. The goals set based on this consideration will also be included in the DLT's long-term project strategy.

Various issues are expected to become apparent during the consideration of strategic goals. These issues should be classified into short-term, medium-term, and long-term challenges, and the breakdown of each should be examined in order of priority, leading to the next step of developing an action plan (on an annual basis). Examples of anticipated short-term, medium-term, and long-term challenges are as follows.

2) Examples of Short-Term Challenges (approximately 3 years)

- Expansion of annual implementation scale (including expansion in some high schools in line with strategic goals).
- Expansion of training targets to include schoolteachers.
- Further training for instructors using the newly created manuals. The DLT is also envisaged to produce and distribute standard theoretical and practical training

videos.

- Establishment of methods for conducting, compiling, evaluating, and providing feedback on pre- and post-training surveys of participants.
- Improvement of training content and establishment of implementation methods based on feedback.
- Conclusion of implementation agreements with some high schools and clarification of responsibilities in conducting the training.
- Development of a traffic safety training database for high school students and integration with the driving license and traffic accident databases.
- Coordination with local driving schools to avoid disrupting private businesses
- Trial outsourcing of parts of the program by regional DLT offices.
- Initiation of public relations activities.

3) Examples of Medium-Term Challenges (approximately 6 years)

- Expansion of annual implementation scale.
- Expansion of schools with implementation agreements.
- Realization of a two-day training period.
- Conclusion of a memorandum of understanding on responsibility-sharing and long-term implementation between the DLT and the Ministry of Education
- Initiation of private sector funding and partial participation of private companies in the program.
- Preparation for establishing a new program implementation entity under the LTSB, including budget and contract management methods, program implementation methods, evaluation and research methods, improvement and development of training content, and relations with regional DLT offices.

4) Examples of Long-Term Challenges (approximately 10 years)

- Achieving an annual implementation scale of 600,000 participants.

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- Conclusion of implementation agreements with all target high schools.
- Transition to a system where the new project implementation entity is responsible for implementing the project, with the LTSB and DLT local offices supervising the entire implementation.
- Further incorporation of private sector funding and promotion of private companies' participation in the program.

7.3.4 Proposal of Re-education Program for Traffic Offenders and the License Renewers

(1) Training for driving license renewal

Every five years, the DLT holds a one-hour video training course at the time of license renewal procedures. In the video, license renewal applicants are appealed to drive safely, but the video has not been necessarily effective.

WG4 (Driving license) introduces an example from Japan and recommends improvements in training for driving license renewal since the renewal process every five years is a valuable point of contact between DLT and drivers. It is also an excellent opportunity for driver reeducation.

1) Training Content

Currently, it only involves watching a driving etiquette and simple driving regulation video. However, as an opportunity for driver re-education, the training will include the following contents.

- Overview of changes in traffic regulations over the past five years
- Training on the current state of traffic accidents, the situation of victims, judicial processes, civil compensation, insurance trends, etc.
- Training on technological trends (various safety devices, electric vehicles, environmental issues, etc.)
- Training on driving manners (including road rage)
- Training in emergency response (response during accidents, disasters, etc.)
- Training for elderly drivers

In addition, a booklet will be issued and handed over with the new license card. Recipients are encouraged to thoroughly read the contents and keep it in their vehicle.

2) Training Participants and Training Duration

- All license renewals are the target, but for lifetime license holders, training without renewal procedures and mandatory physical examinations for those of a certain age (e.g., 60 years and older) will be imposed.
- The duration and content of the training will depend on the penalty point status associated with traffic violations, with one hour for those renewing with zero

penalty points over five years and increasing the training duration and content related to traffic accident situations, driving manners, and traffic regulations as the penalty points increase.

- Additionally, for renewers of a certain age, the training will include content tailored for elderly drivers.

3) Verification Methods for Online Training

- Eligibility for online training is limited to those with zero penalty points or minor violations over five years.
- Various measures will be implemented to prevent proxy attendance and inattentiveness, ensuring that the verification of training conditions is on par with those who took the training at the DLT.

(2) Training for the elderly

Considering the increasing number of elderly drivers in Thailand, many of whom hold lifetime licenses and have not undergone the five-year renewal procedure (including vision tests), we propose a training system for elderly drivers.

Note that the additional tests proposed below will be conducted at the driving license center and not included in the doctor's certificate submitted.

1) Mandatory Physical Examinations for Lifetime License Holders

- Mandate various physical examinations for lifetime license holders of a certain age (e.g., 60 years and older).
- If vision is insufficient, add vision correction as a condition of the license. If reflexes are impaired, add conditions such as using vehicles equipped with advanced safety devices like automatic braking or limiting the license to MT vehicles (which stall if the wrong pedal is operated).

2) Additional Tests for Elderly Drivers

- Since night vision often deteriorates with age, measure night vision for drivers of a certain age (e.g., 60 years and older) during license renewal. If significant deterioration in night vision is observed, add conditions to the license, such as restricting driving to daylight hours.

3) Cognitive Ability Tests

- For drivers of a certain age (e.g., 75 years and older), conduct cognitive ability tests during license renewal if they have been involved in serious traffic violations (such as running red lights or driving the wrong way) and traffic accidents. If cognitive problems are detected, add conditions such as limiting the license to MT vehicles, requiring a licensed driver in the passenger seat, or revoking the license, depending on the severity.

4) Training for Elderly Drivers

- Mandate training for drivers of a certain age during license renewal and upon the occurrence of serious traffic violations or accidents.
- The content of the elderly driver theoretical training should include the relationship between declining physical abilities and driving skills, various license conditions, and driving manners (such as emotion control while driving, which is a challenge for elderly drivers).
- The content of the elderly driver theoretical training should include the relationship between declining physical abilities and driving skills, various license conditions, and driving manners (such as emotion control while driving, which is a challenge for elderly drivers).
- The content of the practical training for elderly drivers differs from general training aimed at improving skills; its purpose is to confirm how drivers can drive safely within the limits of their declining physical abilities and to master those methods. Through various tasks, elderly drivers should become aware of the limits of their driving skills and learn more cautious driving methods.
The target group for the practical training for elderly drivers includes those identified as needing attention based on the criteria specified in items 1) to 3).

It is necessary to study these testing methods, criteria, and the content of both theoretical and practical training by referring to advanced examples from abroad and adapting them to the driving conditions of elderly drivers in Thailand.

Therefore, discussions should be conducted with relevant authorities such as the Ministry of Public Health, researchers, and experts.

7.3.5 Collection and Analysis of the Traffic Accident Data of Commercial Vehicles

In this activity, information on laws and regulations related to operation management, DLT's organizational structure, basic information on commercial vehicles, the status of traffic accidents involving commercial vehicles, and safe operation measures implemented were collected by DLT to grasp the actual situation of operation management in Thailand and collect primary data to promote the "Supervisory Support for Safe Operation Management of Commercial Vehicles by MOT" activity described in the next section. The following (summarized) information has been obtained on the safety operation measures implemented by DLT.

(1) Relevant laws and regulations

The Vehicle Law, the Land Transport Law, and the Road Traffic Law were enacted in 1979 as laws related to operations management. A summary of each is given below.

Motor Vehicle Act (1979)

Laws related to private use vehicles, such as passenger cars, pickup trucks, motorcycles, and cabs.

- Regulations on vehicle registration, vehicle inspection requirements, license plates, and maximum weight
- Driving licenses, road tax, and penalties

Road Traffic Act (1979)

Laws governing traffic rules and road use

- Road traffic signs, traffic signals, speed regulations, etc.
- Penalties

Land Transport Act (1979)

Laws related to commercial vehicles, such as buses and trucks.

- Regulations on vehicle registration, vehicle inspection requirements, license plates, and maximum weight
- Driving licenses and penalties for commercial vehicles
- Bus routes and carrier requirements

Transportation business licenses are divided into four types:

- 1. Business license with a fixed route (valid for 7 years)
- 2. Business license with no fixed route (valid for 5 years)

- 3. Business license for small vehicles (valid for 5 years)
- 4. License for private transportation (valid for 5 years)

The Transport Safety Manager (TSM) system, which was approved in June 2020 and has been fully operating since 2023, is stipulated in Section 36 of the Land Transport Act. The MOT of Thailand has enacted the Transport Safety Regulations (amended as of June 19, 2020), stipulating that operators must have a Transport Safety Manager qualified and trained according to the curriculum. The DLT defines the qualifications and duties of a Transport Safety Manager as follows.

Requirements for TSM

1. Thailand citizen,
2. at least 22 years of age, and
3. has undergone training as prescribed by the DMV. There are three types, as follows:
 - (1) General public: 18 hours training
 - (2) Professional safety managers under the Labor Protection Law: 6 hours training
 - (3) Experienced persons who have worked in traffic management for at least 5 years: 6 hours training period

Responsibilities of TSM

1. Management of vehicles (e.g., preparation of vehicle maintenance management plan, implementation of vehicle maintenance management, checking of equipment, etc.).
2. Bus driver management (e.g., stipulate duties and responsibilities of bus drivers, monitor drunk driving).
3. Transportation management, including preparation of itineraries and monitoring of vehicle running speed.
4. Monitoring of cargo and passenger operations management, including providing operations manuals and inspecting the safety of loads.
5. Supervisory duties, such as preparing plans for accidents and emergencies and preparing accident reports.
6. Perform such duties or other acts as may be assigned by the DLT.

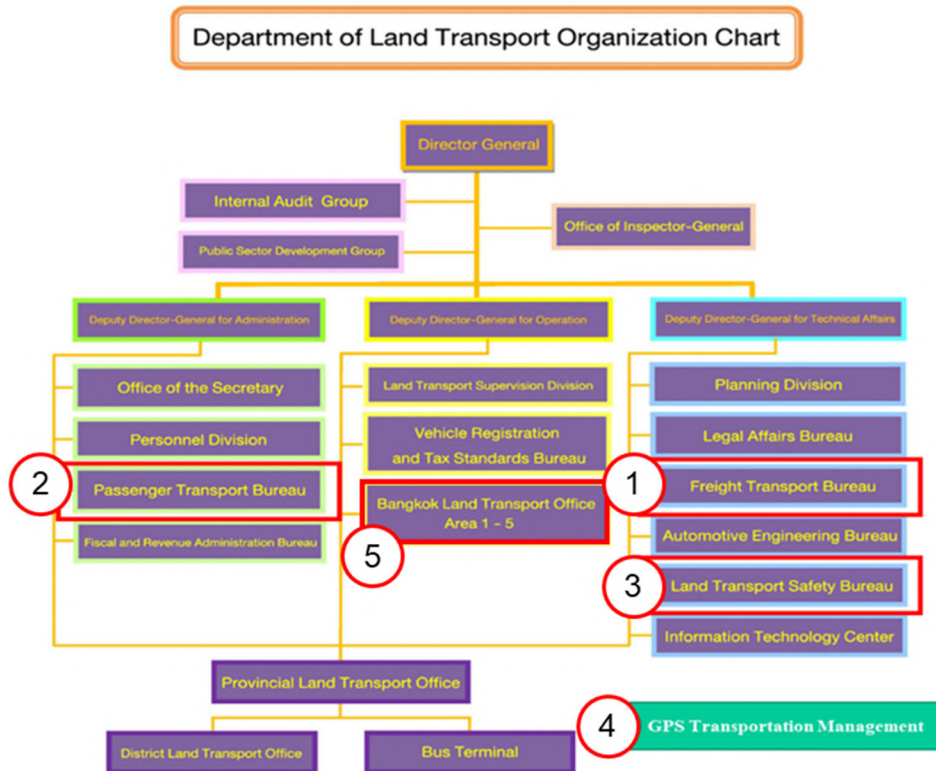
(2) Organizational structure related to operation management at DLT

The following figure shows the organization of DLT. These are the five departments

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involved in the management of commercial vehicle operations.

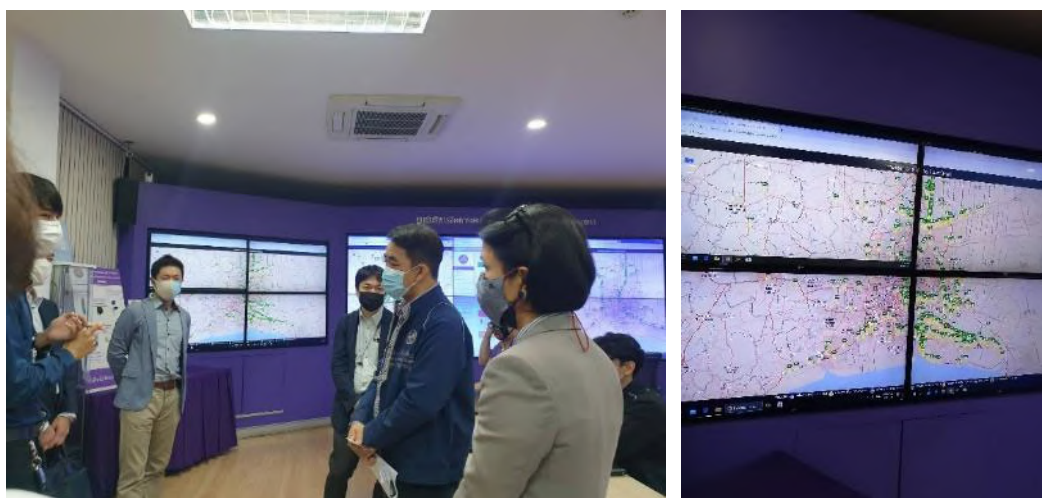
- Land Transport Safety Bureau (LTSB)
- Freight Transport Bureau (FTB)
- Passenger Transport Bureau (PTB)
- GPS Transportation Management (GPSTM)
- Bangkok Land Transport Office Area 5



Source: Created by JET based on information from DLT website

Figure 7.3.25 Organizational Structure of DLT

The FTB is responsible for the business licensing and operator management of truck operations, and PTB for the business licensing and operator management of bus operations. GPS Transportation Management is responsible for collecting and managing GPS data installed in trucks and buses, as well as real-time monitoring at GPS centers.



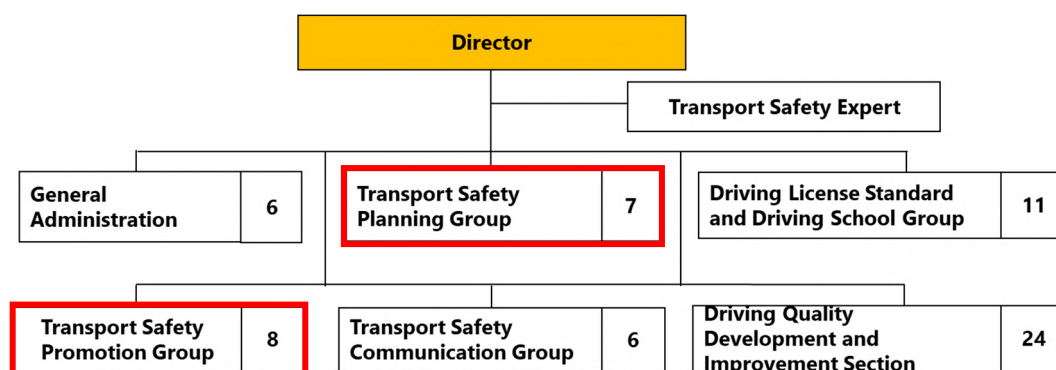
Source: JET

Figure 7.3.26 GPS Center in DLT

The main C/P of Output 4 (Operation Management) is the LTSB. The LTSB manages a commercial vehicle traffic accident data system called the Bus and Truck Accident Information Management System (B-TAIMS), analyzes traffic accidents, and issues traffic accident reports for trucks and buses. Based on the results of this analysis, the LTSB implements safety management measures such as "Q-Mark for Bus and Truck" and checkpoints, which is elaborated in the subsequent section. The LTSB is also in charge of operating the operation manager system.

The LTSB has a Safety Planning Group (7 members) and a Safety Promotion Group (8 members) (see the following LTSB organizational chart). It was confirmed with the C/P that the JICA project activities of Output 4 (Operation Management) are carried out mainly by both groups in cooperation with related organizations, such as PTB, FTB, and GPS management.

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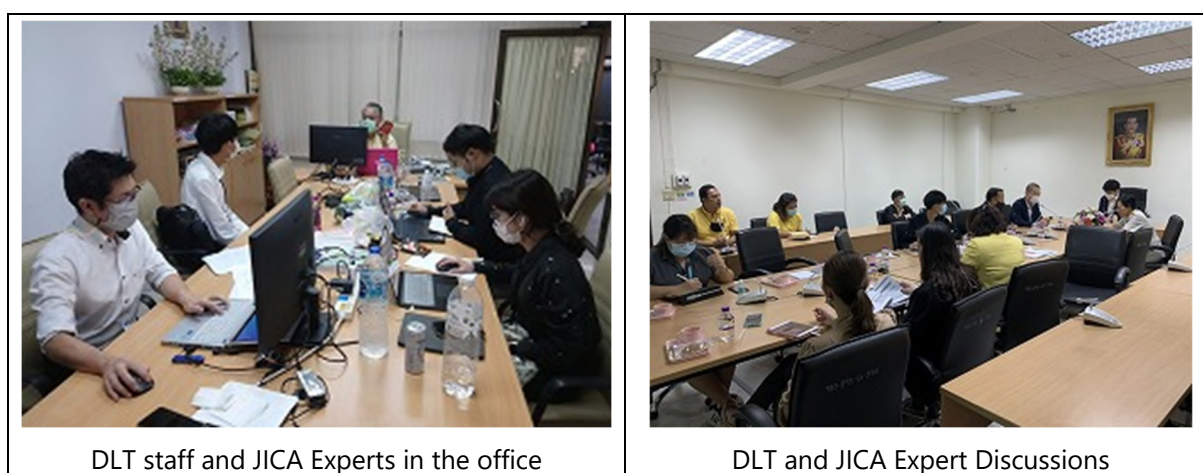


Total Number of Staffs : 64

- Government Official : 53
- Permanent Employee : 1
- Government Employee : 10

Source: Created by JET based on the material provided by DLT

Figure 7.3.27 Organizational Structure of LTSB



DLT staff and JICA Experts in the office

DLT and JICA Expert Discussions

Source: JET

Figure 7.3.28 Activities at DLT

(3) Basic information on commercial vehicles

The number of vehicles registered in Thailand is shown in Table 7.3.3. Approximately 41,471,000 vehicles are registered, of which half are motorcycles. The number of buses and trucks subject to the operation manager system is about 152,000 and 1,174,000, respectively.

Table 7.3.3 Number of Registered Vehicles (as of December 31, 2020)

ประเภทรถ Type of Vehicle	ทั่วประเทศ Whole Kingdom	ส่วนกลาง Bangkok	ส่วนภูมิภาค Regional
รวมทั้งสิ้น Grand Total	41,471,345	10,971,799	30,499,546
ก. รวมรถตามกฎหมายว่าด้วยรถยนต์ Total Vehicle under Motor Vehicle Act	40,145,368	10,779,612	29,365,756
รถยนต์นั่งส่วนบุคคลไม่เกิน 7 คน Sedan (Not more than 7 Pass.)	10,446,505	4,950,810	5,495,695
รถยนต์นั่งส่วนบุคคลเกิน 7 คน Microbus & Passenger Van	434,254	220,196	214,058
รถยนต์บรรทุกส่วนบุคคล Van & Pick Up	6,878,050	1,436,271	5,441,779
รถยนต์สามล้อส่วนบุคคล Motortricycle	1,478	816	662
รถยนต์รับจ้างระหว่างจังหวัด Interprovincial Taxi	-	-	-
รถยนต์รับจ้างบรรทุกคนโดยสารไม่เกิน 7 คน Urban Taxi	80,172	76,538	3,634
- บุคคลธรรมดา	21,322	20,492	830
- นิติบุคคล	58,293	55,495	2,798
- ไม่ระบุ	557	551	6
รถยนต์สี่ล้อเล็กรับจ้าง Fixed Route Taxi	2,442	1,923	519
รถยนต์รับจ้างสามล้อ Motortricycle Taxi (Tuk Tuk)	19,459	9,256	10,203
รถยนต์บริการธุรกิจ Hotel Taxi	4,243	513	3,730
รถยนต์บริการทัศนอาจร Tour Taxi	5,118	1,865	3,253
รถยนต์บริการให้เช่า Car For Hire	76	44	32
รถจักรยานยนต์ Motorcycle	21,396,980	3,879,353	17,517,627
รถแทรกเตอร์ Tractor	574,789	105,420	469,369
รถบดถนน Road Roller	15,516	4,139	11,377
รถใช้งานเกษตรกรรม Farm Vehicle	109,076	7	109,069
รถพ่วง Automobile Trailer	6,704	4,501	2,203
รถจักรยานยนต์สาธารณะ Public Motorcycle	170,506	87,960	82,546
ข. รวมรถตามกฎหมายว่าด้วยการขนส่งทางบก Total Vehicle under Land Transport Act	1,325,977	192,187	1,133,790
รวมรถโดยสาร Bus : Total	151,547	39,865	111,682
แยกเป็น - ประจำทาง Fixed Route Bus	68,758	18,551	50,207
- ไม่ประจำทาง Non Fixed Route Bus	69,055	18,119	50,936
- ส่วนบุคคล Private Bus	13,734	3,195	10,539
รวมรถบรรทุก Truck : Total	1,173,801	152,322	1,021,479
แยกเป็น - ไม่ประจำทาง Non Fixed Route Truck	361,357	87,951	273,406
- ส่วนบุคคล Private Truck	812,444	64,371	748,073
รถขนาดเล็ก Small Rural Bus	629	-	629

Source: DLT

The number of transportation operators subject to the operation manager system is shown in Table 7.3.4. There are approximately 48,000 bus operators and 387,000 truck operators.

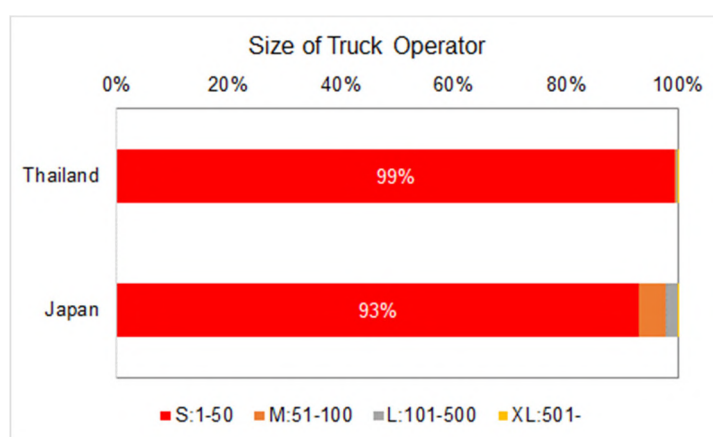
Table 7.3.4 Number of Transportation Operators (as of 30 September 2021)

Bus	Fixed-route	category 1	217	1,485	47,749
		category 2	1		
		category 3	304		
		category 4	962		
		Internationa bus	1		
	Non Fixed-route	Bus	38,105	38,452	
		Internationa bus	347		
	Private	Bus	7,808	7,811	
		Internationa bus	3		
	Others	Small rural bus	1	1	
Truck	Non Fixed-route	Truck	34,898	37,270	386,719
		Internationa truck	2,372		
	Private	Truck	349,267	349,449	
		Internationa truck	182		
total					434,468

Note: Category 1: Traveling within Bangkok
 Category 2: Traveling from Bangkok to another province
 Category 3: Traveling from province to province
 Category 4: Traveling on small roads within Bangkok

Source: JET based on information from DLT

Comparing the number of truck operators in Japan and Thailand shows that 90% of truck operators in both countries have less than 50 vehicles.

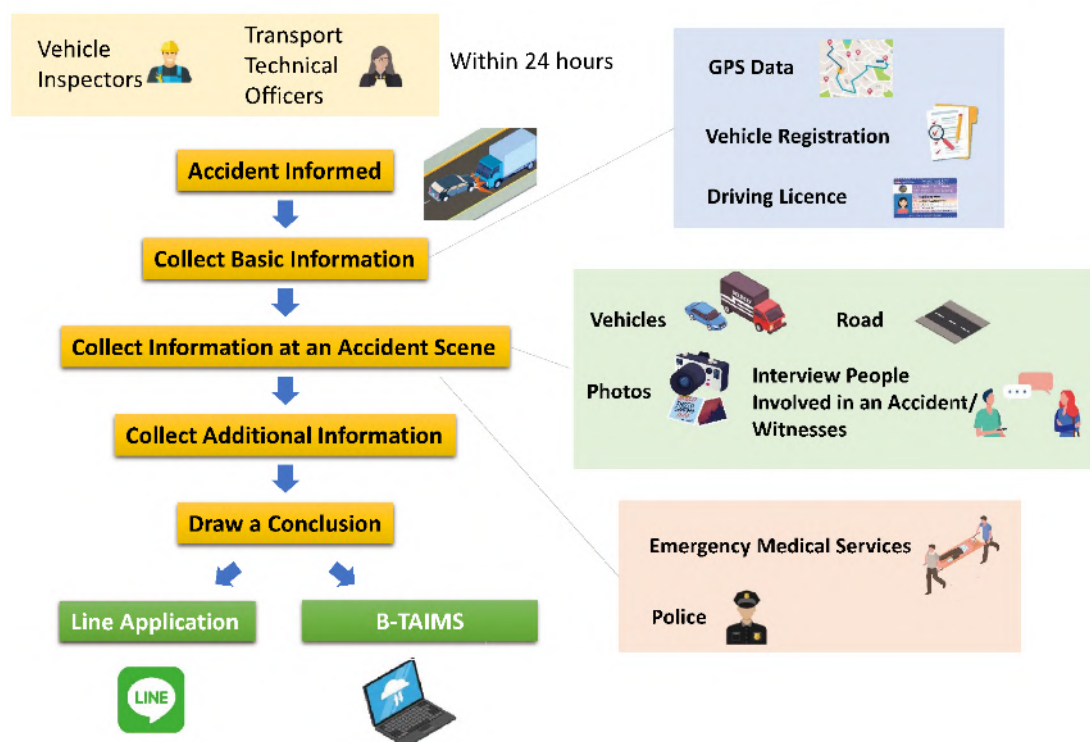


Source: Created by JET based on information from DLT

Figure 7.3.29 Number of Truck Operators by Truck Size

(4) Outline of B-TAIMS (Bus and Truck Accident Information Management System)

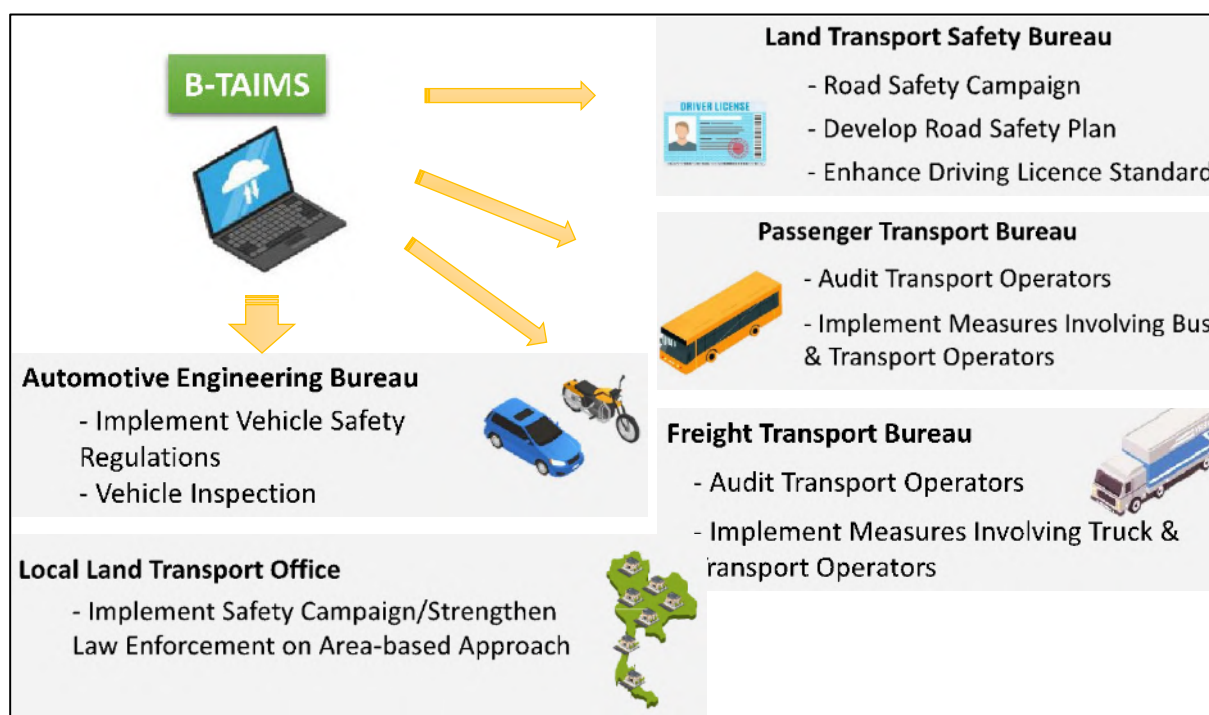
B-TAIMS is a traffic accident database for buses and trucks managed by DLT, which became operational on 1 July 2017. When a traffic accident involving a bus or truck occurs, officials from DLT's Local Land Transport Offices are dispatched to the accident scene, and the collected information is stored in B-TAIMS. The flow of the data collection of B-TAIMS is shown in the figure below.



Source: DLT

Figure 7.3.30 Data Collection Flow of B-TAIMS

LTSB, FDB, PTB, and other related agencies use B-TAIMS to analyze the results of accident data. The types of traffic accident data in B-TAIMS are shown in Table 7.3.5.



Source: JET based on information from DLT

Figure 7.3.31 Utilization of B-TAIMS

Table 7.3.5 Contents of Traffic Accident Data in B-TAIMS

Items	Contents
1. Basic information	1-1. Time of accident, etc. · Time of Incident · Name of DLT Regional Transportation Office · Location of an accident according to GPS data
	1-2. Information on the road · Road type (national road, local road, etc.) · Road condition (e.g., under construction) · Traffic signal presence/absence
	1-3. Location of the traffic accident · Intersection geometry, U-turn points, other (bridges, crosswalks, etc.)
	1-4. Visibility and conditions · Road Surface Conditions (Dry/Wet) · Road Surface Condition · Lighting
	1-5. Vehicle · Number of vehicles, bicycles, pedestrians, etc. involved in traffic accidents
	1-6. Accident details · Vehicles involved in the accident (truck/bus/passenger car, etc.) · Circumstances of the accident · Diagrams or photographs of the accident scene · Circumstances of the collision · Cause of accident
2. Vehicle information based on Land Transport Act	· Type of vehicle, registration number, number of years, number of passengers, insurance number, etc.
3. Vehicle information based on Motor Vehicle Act	· Type of vehicle, registration number, number of years, number of passengers, etc.
4. Driver information	· Name, gender, number of years driving, driving license information, if driving under the influence, etc.
5. Penalties	· Information about the operator and driver

Source: Created by JET based on information from DLT

(5) Traffic Accidents Involving Commercial Vehicles

1) Overview of Truck Traffic Accidents

In 2023, there were 509 accidents involving trucks, 387 fatalities, and 336 injuries. Table 7.3.6 shows the number of truck accidents, fatalities, and injuries. Note that the top five causes of accidents involving trucks in 2023 were inattentiveness (20.6%), dangerous driving (16.1%), speeding (11.4%), drowsy driving (9.2%), and interrupted driving (8.4%).

Table 7.3.6 Number of Accidents Caused by Trucks (2019-2023)

	2019	2020	2021	2022	2023
Number of accidents	736	513	563	591	509
Number of fatalities	526	355	367	405	387
Number of Injured	868	535	303	375	336

Note: Injuries since 2018 are counted only for serious injuries.

Source: DLT

2) Overview of Bus Traffic Accidents

In 2023, there were 206 bus accidents, 76 fatalities, and 316 injuries, as shown in Table 7.3.7. The top five causes of bus accidents in 2023 were inattention (30.58%), dangerous driving (10.68%), slippery road surface due to rain (9.71%), drowsy driving (18.11%), and speeding (11.70%).

Table 7.3.7 Number of Accidents Caused by Buses (2019-2023)

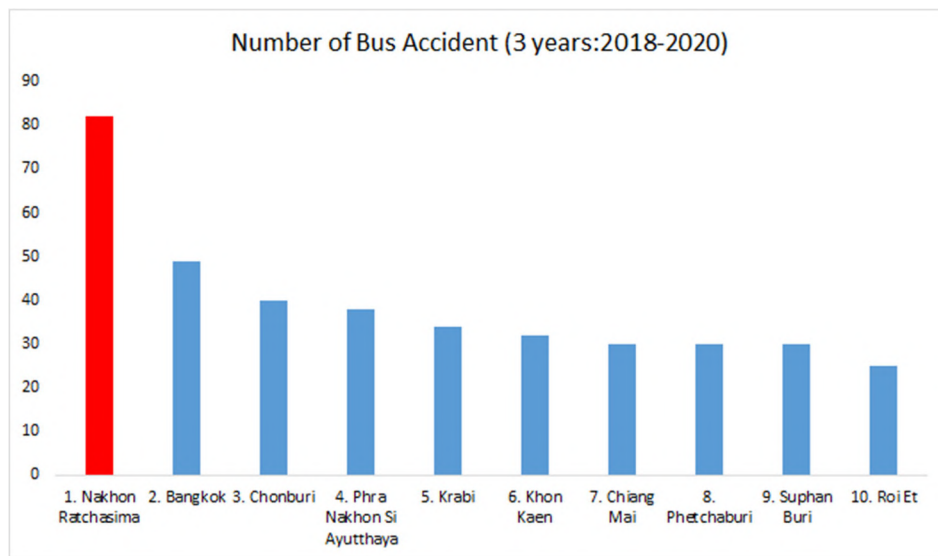
	2019	2020	2021	2022	2023
Number of accidents	414	245	113	142	206
Number of fatalities	180	99	62	66	76
Number of Injured	432	320	156	125	316

Note: Injuries since 2018 are counted only for serious injuries.

Source: DLT

Figure 7.3.32 shows the number of bus accidents by province. Nakhon Ratchasima Province, where the pilot project was implemented in the first year of the project, has a significantly higher number of accidents, far more than other provinces.

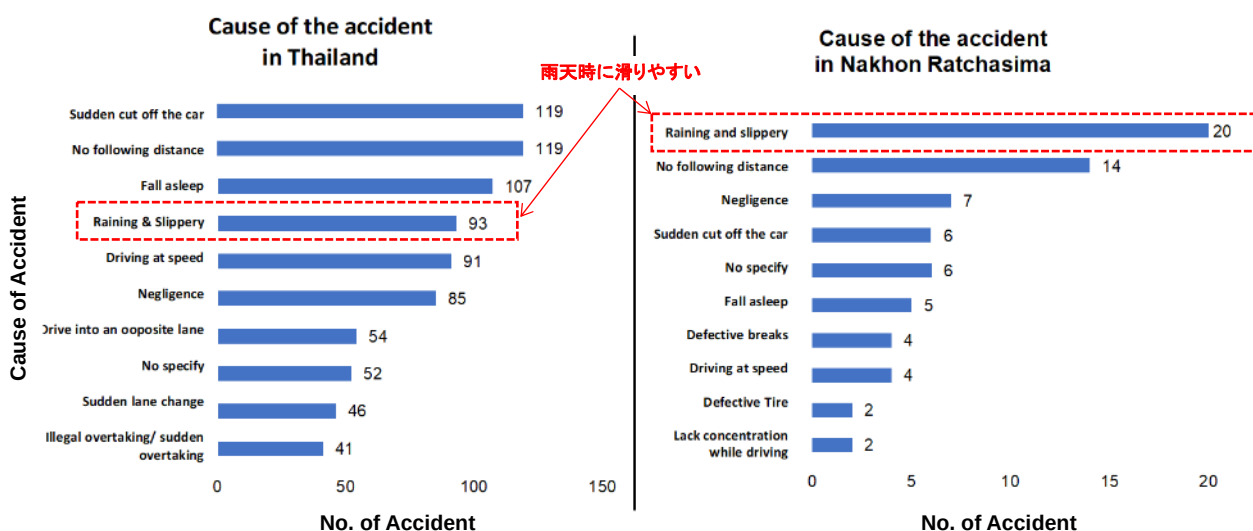
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Source: Created by JET based on information from DLT

**Figure 7.3.32 Number of Traffic Accidents Involving Bus by Province
(3-year total for 2018–2020)**

Comparing the causes of bus accidents in Nakhon Ratchasima Province and nationwide, "slippery in the rain" was the number one cause of accidents in Nakhon Ratchasima Province, indicating that the condition of road surfaces is an issue. The accidents (due to slippery roads) were exceptionally high in 2018. Due to road measures based on analysis of accident data, accidents generated by slipperiness in rainy weather have decreased since 2019.



Source: Created by JET based on information from DLT

Figure 7.3.33 Cause of Traffic Accident by Bus

(6) Training on improving traffic accident data analysis and reporting skills

The following training on accident data analysis and accident report preparation was conducted for the Safety Planning Group (LTSB of the DLT), which manages the traffic accident database for buses and trucks (B-TAIMS). The training comprises the following themes and flow of accident data analysis and accident report preparation.

1. Examples of traffic accident reports in Japan (report items, analysis methods, and perspectives of analysis)
2. Preparation of existing accident reports in Thailand based on the above
3. Discussion on the revised accident report and identification of further modifications
4. Repetition of 2 to 3

B. Improvement of accident data analysis

2-1. Conducting more in-depth analysis by using the existing database

1. Overall accident trends

- (1) Overall number of traffic accidents
- (2) Number of fatalities in traffic accidents
- (3) Number of traffic accidents by type of business
- (4) Number of traffic accidents per 100 million vehicle kilometers traveled by operators
- (5) Number of fatal accidents by type of business
- (6) Number of accidents by driver age group by industry (** years)
- (7) Average age of drivers involved in accidents by type of accident (** years)

2. Characteristics of Truck Accidents

- (1) Transition of the number of accidents/fatalities
- (2) Percentage of accidents/fatalities by behavior
- (3) Percentage of accidents/fatalities by cause
- (4) Percentage of accidents/fatalities by violation
- (5) Time of accidents

2-2. Adding new elements, scale of operators, in the analysis

Identify overall trends

Overall

Analyze by operators

Truck Bus

Analyze in detail

**Behavior
Cause
Violation
Time**

Add analysis elements according to activities

**Behavior
Cause
Violation
Time** **X S/M/L**

Source: JET

Figure 7.3.34 Training Materials for Traffic Accident Data Analysis

7.3.6 Assistance of the MOT to Supervise the Transport Safety Operation Management of Commercial Vehicles

(1) Commercial vehicle safety measures implemented in DLT

1) GPS Data

In addition to speeding, drivers who are overworked and, therefore, the lack of rest are among the causes of traffic accidents in Thailand. DLT is utilizing GPS tracking to address the issue. The GPS was launched in January 2014 for some heavy-duty trucks. It was expanded to trucks and buses on 30 September 2021, with 70,589 installed in buses (20,594 in fixed-route and 49,995 non-fixed-route) and 397,295 in trucks.

DLT has 77 central and regional GPS tracking control centers, with personnel working around the clock to alert drivers and operators when violations or risks are detected. They may also contact the DLT Regional Transport Authority, which has jurisdiction, to monitor the situation. Bus users can also use the DLT GPS mobile application to check the status of bus operations and vehicle speeds and report complaints.

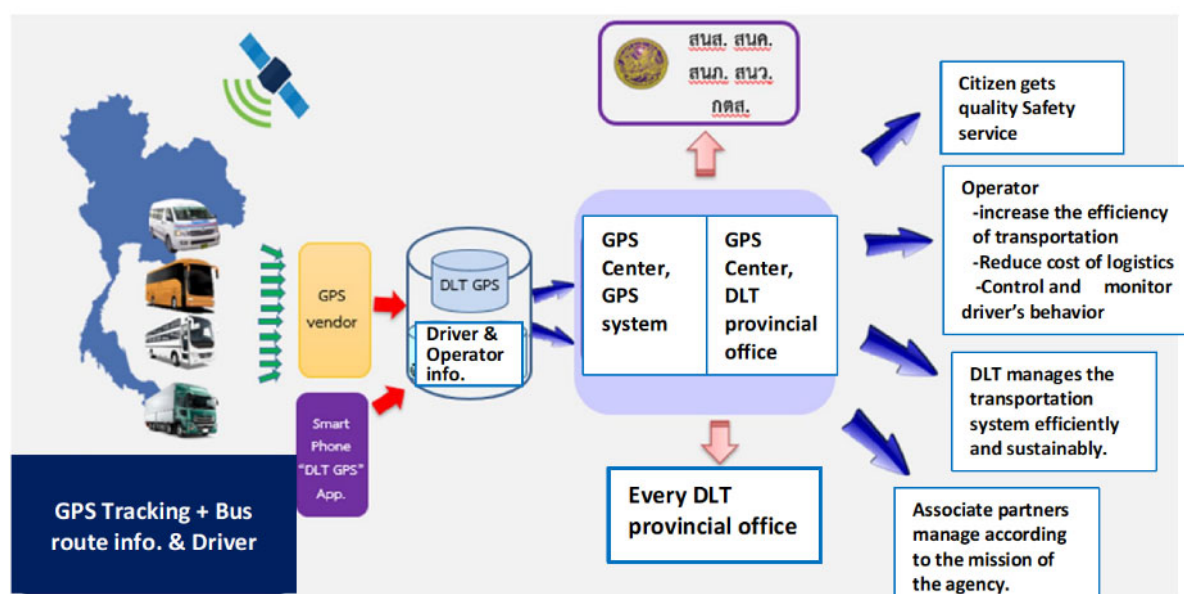
The main violations the GPS tracking center monitors are:

- if the vehicle has been traveling over 90 km/h for more than 2 minutes;
- when the vehicle has been moving for more than 10 minutes, and the driving license has not been authenticated (the driving license must be established first every time the engine is turned on or off, as shown in the figure below);
- when the operating hours exceed 10 hours; and
- when the continuous driving time exceeds 4 hours (drivers must take at least 30 minutes of break for every 4-hour drive).



Source: DLT

Figure 7.3.35 Driving License Authentication



Source: DLT

Figure 7.3.36 GPS Data Operation Flow

2) Q-Bus and Q-Mark

DLT introduced a safety standards certification system called "Q-Bus" and "Q-Mark" to enhance the safety of bus and truck operations. The "Q" stands for qualified, Q-Bus is bus operators, and Q-Mark is truck operators. Q-Bus and Q-Mark are voluntary, and operators wishing to be certified must apply to DLT and meet the evaluation criteria for approval.

PTB and FTB manage the Q-Bus and Q-Mark processes, respectively. Other organizations, such as the LTSB and the Land Transport Supervision Division, provide the necessary information for the certification of operators (e.g., traffic accidents, breakdowns, complaints, etc., related to operators).

Q-Mark launched in 2008, and as of November 2022, 439 truck operators have been certified. On the other hand, Q-Bus began in 2019 and has certified 23 bus operators.

The benefits of Q-Mark and Q-Bus certifications are as follows.

- Thirty-five bonus points out of 100 for evaluation points when applying for cross-border transportation projects.
- Participation in conferences and seminars on freight forwarding (business matching) with neighboring countries with DLT executives.
- Promotion through various events and activities organized by DLT.
- Priority access to truck terminals managed by DLT.



Source: DLT

Figure 7.3.37 Q-Mark/Q-Bus Certification Ceremony

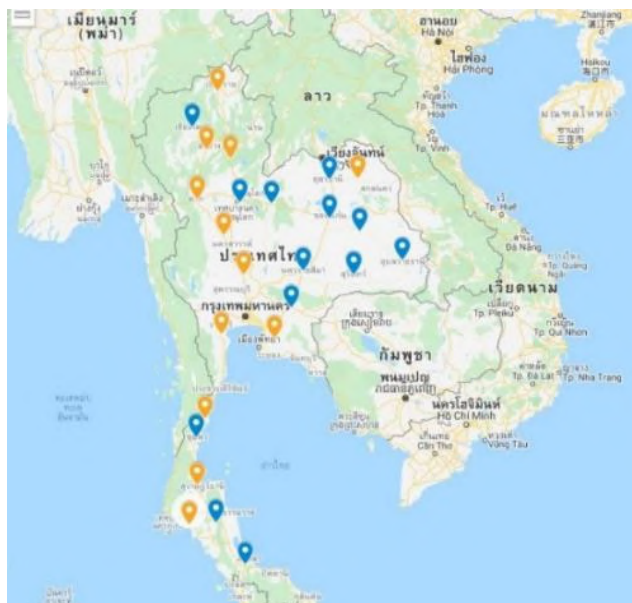
3) Checkpoints

Establishing checkpoints throughout Thailand is an initiative to conduct driver and vehicle inspections for bus safety. LTSB of the DLT is the managing agency, and the respective transport branch offices are the operating agencies. This was launched on 16 September 2019.

The inspection items for buses and drivers at the checkpoints are as follows.

- **Buses:** Check the GPS and its condition, seat belt installation, seats, wheels, doors open and closed, and safety equipment such as fire extinguishers, reflectors, lights, signals, etc.
- **Drivers:** Check for drug and DUI status, driving license, driving hours, rest periods, fatigue level, etc.

There are 28 checkpoints (roughly 200 km apart) throughout Thailand, including Nakhon Ratchasima Province, as shown in Figure 7.3.38.



Source: DLT

Figure 7.3.38 Location Map of Checkpoints

In 2019, among the 4,087,770 vehicles and drivers inspected, 4,764 vehicles and 2,715 drivers were found with violations. In addition to DLT, DOH implements the checkpoints initiative, whereas DLT focuses on vehicle and driver safety checks for buses, and DOH checks truck loads and weights.



Source: DLT

Figure 7.3.39 Drivers and Vehicles Inspection at Checkpoints

(2) Outline of Transport Safety Manager System in Thailand

The TSM system was approved in June 2020 and has been fully operational since 2023. The purpose of this activity is to establish a system for, and support its full-scale operation. An overview of the operation manager system and its implementation schedule are shown below.

The MOT, the agency responsible for road traffic safety, strengthened the driver licensing system, penalized, suspended, and revoked driving licenses for traffic violators; provided safe driving training; and raised awareness of traffic safety among children and youth. In addition to these measures, managing the safe operation of commercial vehicles is an important measure that contributes to traffic security. In light of this, a Ministerial Regulation on the "Transport Safety Manager" (Operation Manager System) was notified on 19 June 2020. Bus and truck operators must assign an operation manager as the person responsible for safety. The manager must attend a training course designated by the MOT and obtain a license as an operation manager.

The responsibility of the operations manager is to manage vehicles, drivers, and loads, including relevant data for analysis and evaluation, to ensure safety.



Source: DLT

Figure 7.3.40 Responsibilities of TSM

The qualification of operation managers is open to transportation operators of at least 22 years of age who have been in operations for at least five years. However, they must also attend 18 hours of training and pass a prescribed examination. The training includes the following:

- 1) Safety of transportation operations: 2 hours
- 2) Laws and regulations of transportation business: 1 hour
- 3) Vehicle maintenance and inspection: 1 hour
- 4) Driver management: 2 hours
- 5) Operational planning: 4 hours
- 6) Loading and passenger safety: 2 hours
- 7) Emergency management: 1.5 hours

8) Accident analysis and prevention: 4.5 hours

The operations manager may accept operations management duties for up to five truck operators, non-fixed-route bus operators, and fixed-route bus operators. A fleet manager may be penalized or have their license revoked if they violate their duties.

Table 7.3.8 Introduction Schedule of TSM

Year	Plan	Progress
2021	Issuance of DLT notices for TSM qualifications, training courses, training durations, and job duties	During legal proceedings (submitted to the Minister of Transport for approval before entering into force)
2022 (1st Quarter)	Creation of TSM on-site training materials and online publication for self-study	Coming soon
Until the end of 2022	- Training and exams for 1,350 TSM and 150 TSM trainers - Conduct electronic testing for experienced operators^{*1} - TSM registration - Construction and development of TSM monitoring system	- Setting up a course outline (18 hours) - Setting up exam questions - Other preparations are being made sequentially according to the plan.
2023	Start of TSM operations (for the following) - New route bus operators (within 180 days of obtaining a license), route bus operators (Category 1 and 2) - New and non-route bus operators (corporations), non-route bus operators (51 units or more) - Bus operators (private, 11 or more), new private bus operators (101 or more) - New and non-route truck operators (11 or more), non-route hazardous goods truck operators (1 or more), non-route truck operators (101 or more) - Truck operators (11 or more trucks), trucks for transporting dangerous goods (6 or more), new truck operators (101 or more trucks)	
2024	TSM operations (for the following) - Route bus operators (Category 3 and 4) - New and non-route bus operators (11–50 units), all non-route bus operators - Existing (6 or more) and new private bus operators (11 or more) - New truck operators (51 or more), non-route truck operators - New (private, 6 or more) and existing truck operators (private, 11 or more)	
2025	- All operators, including the above	

*1: Experienced operators are exempt from participating in the training course and are only required to take an exam.

Source: JET created based on DLT materials

(3) Issues and Measures for Introduction of TSM System

Thailand's first TSM system started in January 2023. That first year is for large-scale operators, medium-scale operators will be added in 2024, and by 2025, all operators will be eligible for TSM.

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Issue 1: More promotion and education for truck and bus operators regarding the significance and necessity of safe operation management is necessary. If the operators believe that "the government has established the system and the operators have no choice but to follow it," the expected effects will not be achieved and continuing and developing the TSM system will be difficult. It is necessary to design the TSM system in such a way that accidents are likely to occur if an operation manager is not appointed and safety management is not carried out, and that operators will suffer severe damage if an accident occurs, and at the same time, operators must understand the benefits of complying with the TSM system.

Issue 2: Although the responsibilities of TSMs are described, specific duties and record formats are not. Only a few large operators will likely be able to comply with the TSM system. Creating a manual that will enable all operators to conduct safety management operations by the TSM system is necessary.

Issue 3: Under Thailand's TSM system, small operators, like one driver/owner, are also subject to TSM. It is necessary to discuss how TSM should be applied concerning such tiny companies and revise the TSM system as required.

Issue 4: The monitoring system (monitoring standards, etc.) under the TSM system has yet to be established. The institutional design of TSM needs to be prepared to determine which institutions will audit operators, how often, and how they will audit operators.

The following table shows the issues with the current TSM system, the events that would occur if remained unresolved, and the measures for addressing the issues.

Table 7.3.9 Issues and Measures on Current TSM System

Subject	Possible event	Measures	JICA Project Activities
1: The operator does not fully understand the significance and necessity of safe operation management.	Operators will not comply with the TSM system, and the TSM system will likely become only a formality.	- Create a system in which traffic accidents are a cost burden for operators (TSM system design). - DLT to implement public relations and awareness for the operators to understand the above.	- Activity-2: TSM Policy Discussion - Activity-3: PR (Training/Education) for operators
2: Responsibilities of TSM are described, but specific duties and record formats are not	- Varying quality of documents prepared by the operators. - Some operators are unable to properly implement TSM works.	- Create a TSM Operational Guideline that makes all operators carry out work for TSM. - Implement training for operators through DLT.	Activity-1: TSM-Pilot Activity

indicated.			
3: Small-scale operators may not apply TSM schemes	Small operators can not properly conduct TSM works.	- Include small-scale operators in the TSM-Pilot Activity to evaluate the applicability of TSM for operators. - Implement a policy discussion on how to deal with small-scale operators.	- Activity-1: TSM-Pilot Activity - Activity-2: TSM Policy Discussion
4: A monitoring system isn't established	- DLT is unable to monitor a vast number of operators, especially small operators. - If the monitoring function is weak, operators cannot properly perform TSM duties, and some operators will operate without a TSM.	'Audit system' will be studied in A-2 : TSM Policy Discussion. - Use of ICT technologies such as GPS and drive recorders for operation management.	- Activity-2: TSM Policy Discussion - Activity-1: TSM-Pilot Activity

Source: JET

Addressing the first is very important to continue and develop the TSM system. Operators must understand the necessity of the TSM system and create a system that allows them to "understand the necessity of the TSM system and implement it proactively" rather than "implementing the system because it exists (or because they have no choice)."

As a course of action to address the first issue, DLT will conduct public relations and educational activities to help operators understand this fact, along with activities to study the design of a TSM system in which operators will be severely punished if they cause traffic accidents without properly implementing operation management services, which in turn will result in a significant cost burden.

If the TSM system is launched with the second issue unresolved, there is a strong possibility of a significant variation in the accuracy of documents prepared by different operators. Some operators must know what documents to prepare, and there is a concern that TSM operations may stop there. For example, the TSM system stipulates that "the operation manager shall take roll calls" but does not indicate the frequency and contents of the roll calls or the format of the documents that summarize the results of the roll calls.

The policy to address the second issue is to prepare a "TSM Operational Guideline." The project team shall verify whether operators can apply the TSM system by using the TSM Practical Manual in their TSM pilot activities.

The third issue raised, whether small businesses can apply for the TSM system, is the biggest problem/issue in the current TSM system. Under the Thai TSM system, sole

proprietors of trucks are also eligible for the TSM system, meaning one person can be both a business owner and a driver/operation manager and manage their operations. Under Japan's TSM system, a business (office) with less than five vehicles, each with a seating capacity of 10 or fewer, appoints an operation manager. Still, the operation manager does not need to be qualified and is not required to notify the Ministry of Land, Infrastructure, Transport, and Tourism of the TSM system. However, for vehicles with an 11 or more seating capacity, a qualified operation manager must be appointed from one vehicle. The requirements for a transportation business (trucking) license stipulate that "a minimum of five trucks or other cars and a minimum of five drivers are required." Therefore, sole proprietorship trucking business owners in Thailand are not subject to the operation manager system.

When addressing the third issue, small-scale operators will be included as model operators for TSM pilot activities to verify whether small-scale operators can apply for the TSM system. Furthermore, there will be a policy discussion on the TSM system. A TSM system study team consisting of DLT, experts (e.g., academics involved in the creation of the TSM system) and a project advisor (Prof. Fukuda) will be established to propose improvements to the TSM system.

Suppose the TSM system is launched without establishing a monitoring system (monitoring system, monitoring standards, etc.) for Issue 4. In that case, DLTs will not be able to do systematic and planned monitoring, and as a result, operators will not comply with the TSM system. The TSM system will also likely become a skeleton.

As a policy for addressing Issue 4, ICT technologies such as GPS and drive recorders should be used for operation management. However, since it is challenging to share GPS data with JETs and install new drive recorders in many operators, a method to verify the effectiveness of ICT technologies such as GPS and drive recorders by limiting the number of model operators for TSM pilot activities is possible. Additionally, the TSM system study activities will address the ideal monitoring system under the TSM system.

(4) Framework of WG4-TSM Activities

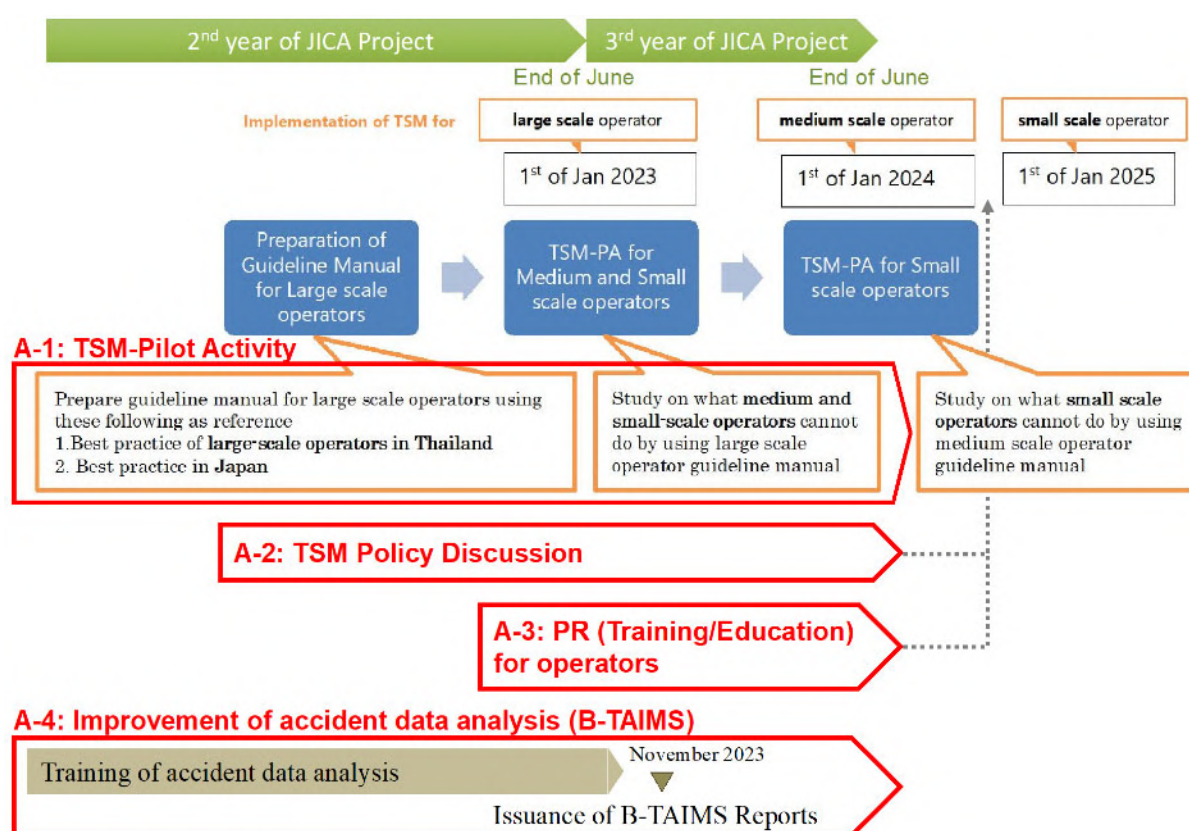
Based on the issues of the TSM system and the policy to deal with them, the following activities will be carried out. in JICA projects

- Activity-1 : TSM-Pilot Activity

- Activity -2: TSM Policy Discussion
- Activity -3: PR (Training/Education) for operators

In addition to this, "Activity-4: Improvement of accident data analysis (B-TAIMS)" will be continued for the Safety Planning Group (LTSB of the DLT), which manages the traffic accident database for buses and trucks (B-TAIMS). Activity-4 will be continued.

The framework of WG4-TSM activities is shown in the figure below. Issues and policies of the TSM system and the framework of TSM activities were discussed with the DLT (LTSB, FTB, and PTB) and project advisors.



Source: DLT

Figure 7.3.41 Framework of TSM Activities in the Project

Activity-1: TSM-Pilot Activity

In this activity, the TSM operational guidelines were developed concerning the efforts of the best operators and were completed through the TSM pilot activities. The DLT-LTSB issued a letter to the FTB and PTB to select TSM working group members. The following working-level members were assigned.

Table 7.3.10 Member List of TSM Working Group

Organization	Name	Position
DLT-LTSB	Mr. Thanadech Asipong Mrs. Pornthip Phoonsam Ms. Pafan Jangbua	Safety Enhancement Group
DLT-FTB	Ms. Tanapak Songkhamchai Mr. Ditsarin Vongasemjit Ms. Thanita Thanasarn	Transport Technical Officer
DLT-PTB	Ms. Pacharang Praphruetdee	Expert on Passenger Transport
DLT-Other	Ms. Chukwan Yuman	Transport Technical Officer, DLT Area5 (Chatuchak), Transport Technical Division

Source: JET

An overview of this activity is shown in the next figure.

TSM Pilot Activity

(1) Purpose of TSM-PA

- The purpose is to ensure smooth implementation of the TSM program based on the monitoring data of the TSM-PA.
- TSM is tested and evaluated with transportation operators (Model Operators) willing to cooperate in the project.

(2) Roles of the model operators

- Record all activities of TSM and share them with DLT.
 - Staff Work Information
 - Vehicle Operation Information
 - Traffic Accidents Information
 - Vehicle Inspection Results
- Share problems, improvements, and requests for TSM with DLT.
- Share the GPS data to evaluate the availability of GPS data for operation management.

(3) List of the model operators

Truck	
Non-fixed route	1. J&J Logistics System Company Limited 2. Global Progress Transport Company Limited
Private	To Be Decided
Bus	
Fixed route	To Be Decided
Non-fixed route	Thanatwit Travel Group Company Limited
Private	To Be Decided

(4) Advantages of Model Operators (MOs)

- MOs can improve the operation system by reference to the Japanese experience.
- MOs can make a network with DLT.
- MOs can convey their requests for the TSM system to the DLT, and TSM shall be revised suitably for operators.
- MOs' cooperation will be publicized at seminars or on the website of JICA projects.

(5) Confirmation items in TSM-PA

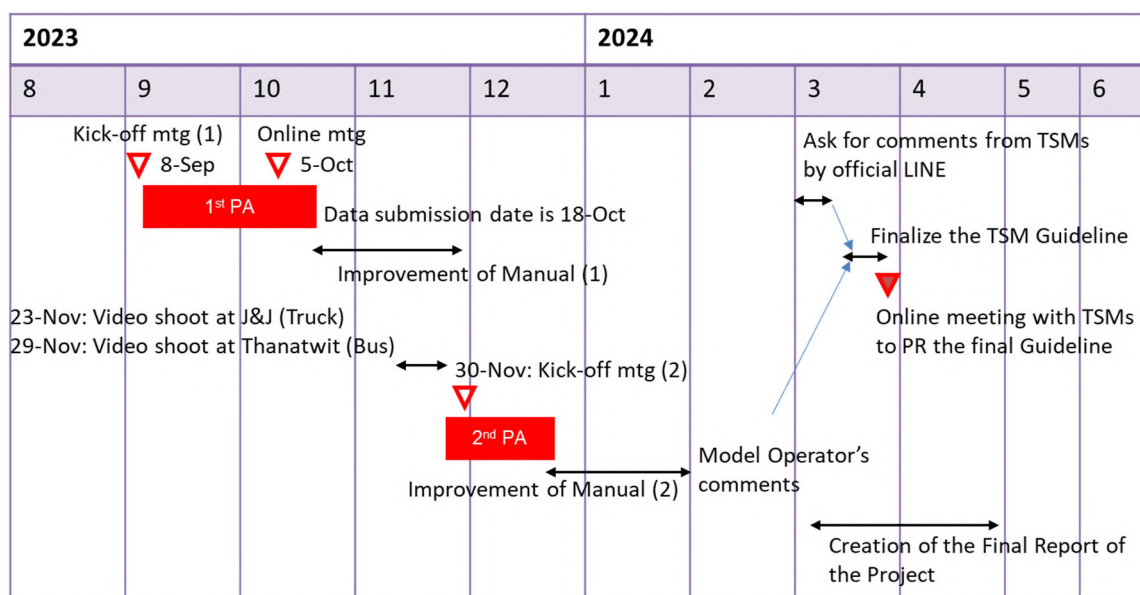
- Whether operators can respond to the first TSM in Thailand.
- How DLT manages small-scale operators account for 99% of the total.
- The possibility of ICT in operation management, such as GPS and drive recorders, etc.

Source: DLT

Figure 7.3.42 Outline of TSM Pilot Activity

As shown in Figure 7.3.43, 29 model operators participated in TSM pilot activities in September and December 2023. A kick-off meeting was held on day one of the first pilot activity to explain the TSM operational guidelines developed in this Project. The model

operators did TSM works using the guidelines and commented on improving the guidelines for DLT.



Source: JET

Figure 7.3.43 Schedule for TSM Pilot Activities and Preparation of TSM Operational Guidelines

After the second TSM pilot activity, model operators were asked to fill out a questionnaire survey to evaluate the pilot activity. The questionnaire was distributed to 29 model operators. Eighteen companies responded. The primary responses were as follows

- 97% of respondents believe safe operations management is essential.
- Combining the responses of "I understood it fairly well (63%)" and "I understood it partially (34%)," 97% of the respondents indicated that they understood safe operations management.
- On the frequency of implementation of safety operation management during the TSM pilot activities, 31% responded with Always (100%), 41% with Often (70%), and 25% with Sometimes (50%).
- There are 94% responses, indicating that they will continue to manage safe operations.
- 97% of respondents answered that they could understand the daily inspection of vehicle contents of the TSM operational guidelines, and 84% responded that they could put them into practice in their daily work.
- 97% of respondents answered that they could understand the roll call contents of TSM operational guidelines, and 84% responded that they could put them into practice in their daily work.
- All respondents (100%) said they could understand the emergency response contents

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of the TSM operational guidelines, and 94% could put them into practice in their daily work.

The table below shows the list of model operators.

Table 7.3.11 List of Model Operators

No.	Company Name	Business Type
1	บริษัท ขนส่ง จำกัด (The Transport Company Limited)	Bus (Fixed route)
2	บริษัท แมจิก รุทส์ จำกัด (MAGIC ROUTES Co., Ltd.)	Bus (Non-fixed route)
3	บริษัท ไทย สมายล์ บัส จำกัด (THAI SMILE BUS Co., Ltd.)	Bus (Fixed route)
4	บริษัท ไพศาลสามัคคีขนส่ง จำกัด (PAISANSAMUKKEE TRANSPORT Co., Ltd.)	Bus (Fixed route)
5	บริษัท คิวมิคซัพพลาย จำกัด (Q MIX SUPPLY Co., Ltd.)	Truck (Private)
6	บริษัท จี.จี. ทรานสปอร์ต จำกัด (G.G. TRANSPORT Co., Ltd.)	Bus (Non-fixed route)
7	บริษัท ช.การช่าง จำกัด (มหาชน) (CH. KARNCHANG Pub Co., Ltd.)	Truck (Private)
8	บริษัท ชัยวิเศษ แทรนสปอร์ต จำกัด (CHAIWISSET TRANSPORT Co., Ltd.)	Bus (Fixed route)
9	บริษัท ซีพีเอฟ (ประเทศไทย) จำกัด (มหาชน) (CPF (THAILAND) Pub Co., Ltd.)	Truck (Private)
10	บริษัท ซีวิล คอนสตรัคชั่น เซอร์วิส เซส แอนด์ โปรดักส์ จำกัด (CIVIL CONSTRUCTION SERVICES & PRODUCTS Co., Ltd.)	Truck (Private)
11	บริษัท ทราเวล มาร์ท แบงกอก จำกัด (TRAVEL MART BANGKOK Co., Ltd.)	Bus (Non-fixed route)
12	บริษัท ทีทีเค เอเชีย ทรานสปอร์ต (ไทยแลนด์) จำกัด (TTK ASIA TRANSPORT (THAILAND) Co., Ltd.)	Truck (Non-fixed route)
13	บริษัท นครชัยแอร์ จำกัด (NAKHONCHAI AIR Co., Ltd.)	Bus (Fixed route)
14	บริษัท นครบริการขนส่ง จำกัด (NAKORN BORIKARN Co., Ltd.)	Bus (Fixed route)
15	บริษัท นิปปอนสตีลโลจิสติกส์ (ไทยแลนด์) จำกัด (NIPPON STEEL LOGISTICS (THAILAND) Co., Ltd.)	Truck (Non-fixed route)
16	บริษัท บางกอก 118 จำกัด (BANGKOK 118 Co., Ltd.)	Bus (Fixed route)
17	บริษัท พรปิยะฉาน โลจิสติกส์ จำกัด (PORNIYACHARN LOGISTICS Co., Ltd.)	Truck (Non-fixed route)
18	บริษัท มนตรีทรานสปอร์ต คอร์ปอเรชั่น จำกัด (มหาชน) (MONTRI TRANSPORT CORPORATION Pub Co., Ltd.)	Bus (Non-fixed route)
19	บริษัท ยูนิคแกส แอนด์ ปีโตรเคมีคัลส์ จำกัด (มหาชน) (UNIQUE GAS AND PETROCHEMICALS Pub Co., Ltd.)	Truck (Private)
20	บริษัท รุ่งเรือง จำกัด (ROONG-REUANG COACH Co., Ltd.)	Bus (Fixed route)
21	บริษัท ลัคกี้แคร์ริเออร์ จำกัด (LUCKY CARRIER Co., Ltd.)	Truck (Non-fixed route)
22	บริษัท สมาร์ทบัส จำกัด (SMART BUS Co., Ltd.)	Bus (Fixed route)
23	บริษัท สาม ทรานสปอร์ต จำกัด (THREE TRANSPORT Co., Ltd.)	Truck (Non-fixed route)
24	บริษัท อาร์ ที เอ็น โลจิสติกส์ จำกัด (R.T.N. LOGISTICS Co., Ltd.)	Truck (Non-fixed route)
25	บริษัท อิตาลีไทย ดีเวลอปเม้นท์ จำกัด (มหาชน) (ITALIANTHAI DEVELOPMENT Pub Co., Ltd.)	Truck (Private)
26	ห้างหุ้นส่วนจำกัด เบิร์มศรีขนส่ง (BERM SRIKHONSONG Part., Ltd.)	Truck (Non-fixed route)
27	องค์การขนส่งมวลชนกรุงเทพ (Bangkok Mass Transit Authority)	Bus (Fixed route)
28	บริษัท พลัส โพรเกรส เอ็นจิเนียริง จำกัด (PLUS PROGRESS ENGINEERING Co., Ltd.)	Truck (Private)
29	บริษัท เจ แอนด์ เจ โลจิสติกส์ ซิสเต็มส์ จำกัด (J&J Logistics System Co., Ltd.)	Bus (Non-fixed route)

Source: JET

Activity-2: TSM Policy Discussion

Activity-2 aims to clarify the current TSM system issues and promote project activities to resolve the problems. Members of this activity comprises DLT executives and experts involved in establishing the TSM system in Thailand, as well as experts familiar with the traffic situation in the country.

Table 7.3.12 Activity-2: Member List of TSM Policy Discussion

Organization	Name	Position
DLT	Mr. Titipat	Director of Transport Safety Bureau, Department of Land Transport
	Ms. Wilawon	Chief of Safety Promotion Group, Transport Safety Bureau, Department of Land Transport
Experts	Dr. Varameth	Associate Professor of Transportation Engineering, Kasetsart University
	Dr. Tuenjai Fukuda	Secretary-General, ATRANS (Asian Transportation Research Society)
Project adviser	Dr. Atsushi Fukuda	Professor, Department of Transportation Systems Engineering, Nihon University
JET	Mr. Ohno	Traffic Operation Management, JICA Expert Team

Source: JET

Activity -3: PR (Training/Education) for operators

This activity aims to make the TSM system known to transport operators in Thailand through promotion and awareness activities by DLT. The member of this activity is the Safety Promotion Group under LTSB of the DLT. Part of this activity is an online meeting with the Transport Safety Managers on 27 March 2024 to introduce the TSM operational guidelines.

Activity-4: Improvement of accident data analysis (B-TAIMS)

This activity, already conducted in the past, aims to improve the ability to analyze traffic accident data (B-TAIMS) and prepare traffic accident reports for the Safety Planning Group under LTSB of the DLT. Training was provided on how to study by cross-tabulation, focus on specific themes, and prepare accident reports.

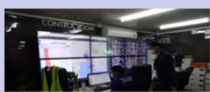
(5) Indicator of the activity: Three-operator inspection

The following evaluation indicator has been mentioned in the PDM.

4-2. Three inspections for safety operation management to commercial vehicle operators, including medium and small operators are implemented.

Three operators were visited to study their safety operation management, such as the TSM work, document creation, and driver training. The current TSM work situation of 29 operators (model operators of the TSM Pilot Project), including small and medium-sized companies, was also studied.

Project Completion Report

Target company	Inspection Date	Inspection Contents
Thanatwit Travel Group Company Limited (Bus)  Monitoring by GPS  GPS room	24 May 2022 15 Feb 2023	(1) Organization 1) Outline of offices 2) Organizational structure of each office (2) Efforts to ensure safety 1) Measures of safety operation 2) Person in charge of safety management, their duties 3) Outline of calls, daily vehicle check 4) Alcohol check equipment 5) Driver training system (3) In case of a traffic accident 1) Communication system in case of a traffic accident 2) Contents of the accident report (4) Operation 1) Outline of operation plan 2) ICT equipment for operation management
J&J Logistics System Company Limited (Truck)  Meeting scenery  Operation Standard	30 May 2022 14 Feb 2023	
TTK ASIA TRANSPORT (THAILAND) (Truck)  Health check at Tenko  Progress check by GPS	13 Feb 2023	

Source: DLT

Figure 7.3.44 Outline of Three Inspections

The following items were confirmed at the meeting.

- (1) Organization
 - 1) Could you let us know the company's offices (head office and sales offices)?
 - 2) Could you let us know the organizational structure of each office? (Departments, number of officers/drivers of each department, roles of each department)
- (2) Efforts to ensure safety
 - 1) What measures are you implementing to ensure the safety of the operation?
 - 2) Do you have an operation manager or someone in charge of safety management?
 - 3) If so, what are their duties?
 - 4) If there is no safety manager, who manages safety?
 - 5) Do you conduct roll calls for drivers? If so, what are the details? (Frequency of roll call, content of roll call, and status of roll call reports)
 - 6) Do you have facilities where drivers can take a break or stay overnight?
 - 7) What is your driver training system?
 - 8) What other measures, if any, do you take to ensure safety?
- (3) In case of a traffic accident
 - 1) What is your communication system in case of a traffic accident?
 - 2) Do you prepare reports on traffic accidents? If so, who prepares them? What are the contents of the report?
 - 3) Do you report traffic accidents to DLT?
- (4) Bus operation
 - 1) Who prepares the bus operation plan?

- 2) Do you prepare the report of a daily operation result?
- 3) What are the types and contents of documents related to the operation?
- 4) Who prepares those documents?
- 5) Are "drive recorders" or "digital tachographs" installed on your buses in addition to GPS?
- (5) Vehicle inspections
 - 1) When and how are vehicle inspections conducted?
 - 2) Who conducts the vehicle inspections?
 - 3) Can you share the vehicle inspection results, if any?

(6) TSM Daily Operational Guidelines

Background

The TSM, responsible for safety management on the front line, must understand and comply with laws and regulations and guide drivers, thus assuming a significant role in safety management. The compliance requirements and tasks of TSM are diverse. Because of this situation, this manual describes the detailed instructions of the primary TSM duties. This manual has been created to ensure they perform their daily tasks properly and take further safety measures.

Premise of the manual

This manual focuses on vehicle management (daily vehicle management), driver management (roll call), and emergency response of the responsibilities of TSM.

The manual is created based on Japanese experience and improved to fit the actual situation in Thailand.

Step of Preparation

- Step-1: JET drafted the manual based on the Japanese experience.
- Step-2: DLT improved the manual to fit the actual situation in Thailand and the TSM system.
- Step-3: Improved user-friendly manual.
- Step-4: Finalized through the TSM pilot project.

Contents of the manual

- 01 Introduction
- 02 Vehicle Management

Project Completion Report

- 03 Driver Management
- 04 Emergency Response
- 05 Case Study from Japan
- 06 Video of vehicle inspections and roll call for truck and bus

Example of description

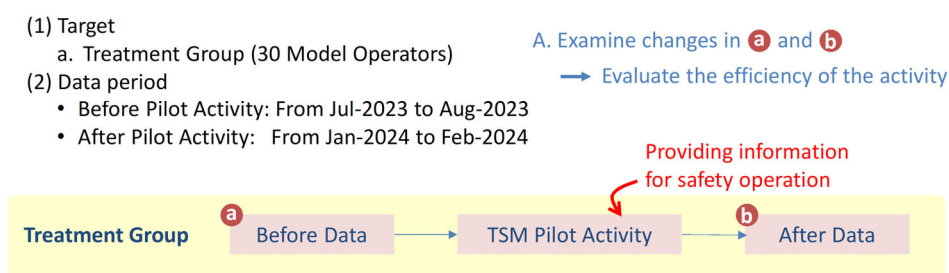


Source: DLT

Figure 7.3.45 Example of TSM Operational Guideline

(7) Verification of Effectiveness of Activities

The effect of safe operation management on traffic safety is verified by comparing driving information before and after the TSM pilot activities of model operators. The concept of the effectiveness verification is shown in the figure below.



Source: JET

Figure 7.3.46 Concept of Effectiveness Verification

The data used for verification is shown below.

Table 7.3.13 List of Model Operators

Sources	Information Technology Center, DLT
Summary	GPS data of buses and trucks aggregated from the number of speeding violations and driving time violations
Subject	29 companies that participated in the TSM pilot activities
Time period	Before: 1 July 2023–31 August 2023 (62 days) After: 1 January 2024–29 February 2024 (60 days)
Number of data	Total trips: 71,548 (before), 69,360 (after) Total number of vehicles: 1,002 (before), 958 (after)
Items	▪ Overspeeding ▪ Daily driving time (maximum of 10 hours of driving per day) ▪ Continuous driving time (continuous driving time is max 4 hours)

Source: JET

Vehicle Speed

The speed of private trucks, which account for 80% of commercial vehicles, decreased from **43.5 km/h to 39.5 km/h** before and after the pilot project.

Number of Violations

As shown in Figure 7.3.47, the number of violations per trip decreased before and after the TSM pilot activity.

- Number of speeding violations: **18.6%** decrease
- Daily driving time violations: **16.1%** reduction
- Continuous driving time violations: **14.2%** reduction

Project Completion Report

Driving Behavior: Speed violation

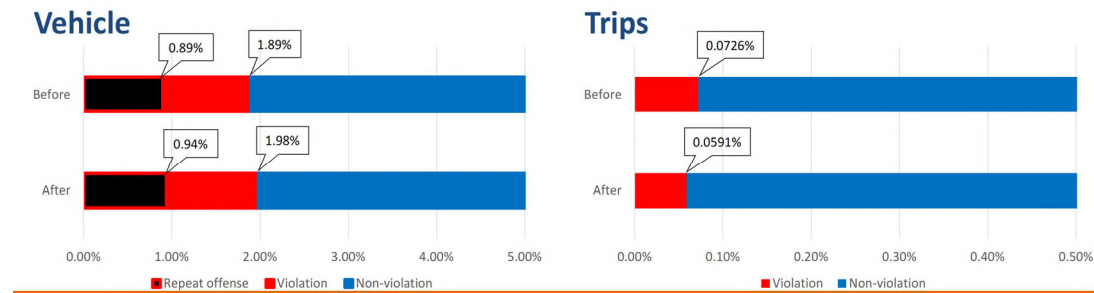
Number of violation

By vehicle

Before: 19 vehicles (9 are repeat offense) After: 19 vehicles (9 are repeat offense) → Same number

By trip

Before: 52 cases (0.0726%) After: 41 cases (0.0591%) → Decrease by 18.6%



Source: JET

Figure 7.3.47 Comparison of Traffic Rule Violation before and after TSM Pilot Activity (Overspeed)

Driving Behavior: Driving time per day

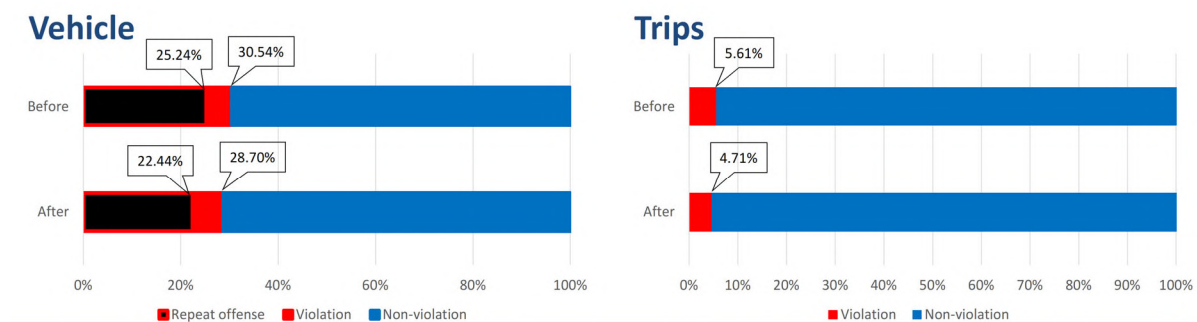
Number of violation

By vehicle

Before: 306 vehicles (253 are repeat offense), 30.44% After: 275 vehicles (215 are repeat offense), 28.70% → Decrease by 5.9%

By trip

Before: 4014 cases (5.61%) After: 3264 cases (4.71%) → Decrease by 16.1%



Source: JET

Figure 7.3.48 Comparison of Traffic Rule Violations before and after TSM Pilot Activity (Daily driving time)

Driving Behavior: Continuous driving time

Number of violation

By vehicle

Before: 490 vehicles (413 are repeat offense), 48.90% After: 456 vehicles (380 are repeat offense), 47.60% → **decrease by 2.5%**

By trip

Before: 7576 cases (10.59%)

After: 6191 case (8.92%)

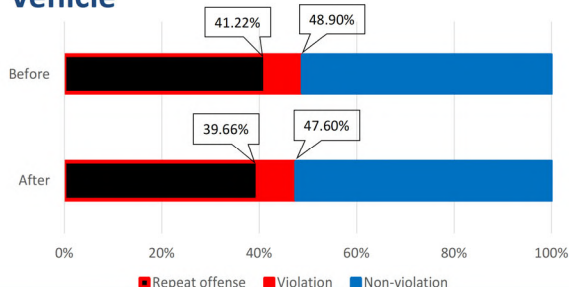
→ **decrease by 15.8%**

Total overlimit time → Before: 974 days 18 h 50 min 39 sec After: 773 days 13 h 5 min 11 sec

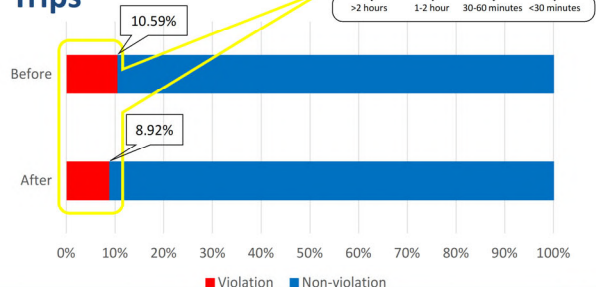
Average overlimit time → Before: ~22 minutes/vehicle/day After: ~19 minutes/vehicle/day

→ **decrease by 14.2%**

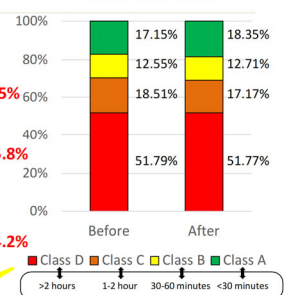
Vehicle



Trips



Violation Case

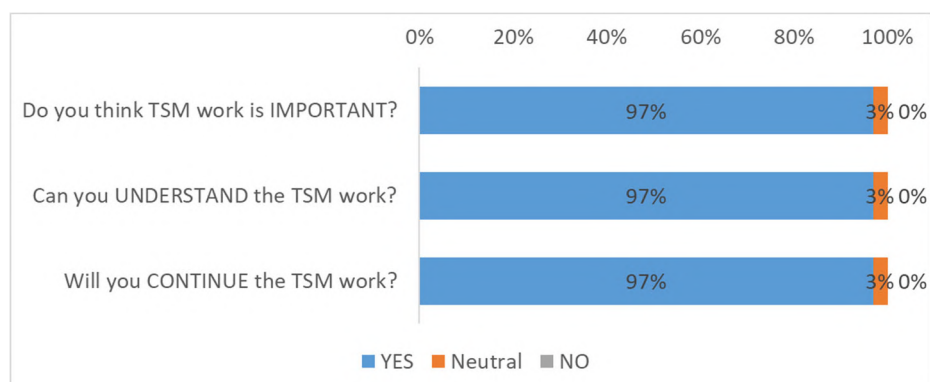


Source: JET

Figure 7.3.49 Comparison of Traffic Rule Violations before and after TSM Pilot Activity (Continuous driving time)

Driver awareness of safety operation management

The model operators who participated in the TSM pilot project filled out a questionnaire survey. It was confirmed through the survey that 97% of the model operators understood the importance and content of TSM work and were willing to continue TSM operations.



Source: JET

Figure 7.3.50 Driver awareness of Safety Operation Management

(8) Approach to Reducing Traffic Fatalities by 30% Based on Accident Data Analysis

Causes of traffic accidents involving commercial vehicles

Vehicle-related causes involving trucks and buses account for 7% of traffic accidents, overspeeding for 11%, and drunk or drowsy driving for 15%. Among operators, 7% have repeat traffic accidents more than twice a year.

The TSM operation manual covers vehicle inspections, roll calls, and responses to traffic accidents. Traffic accidents will be reduced if the operators utilize the TSM manual.

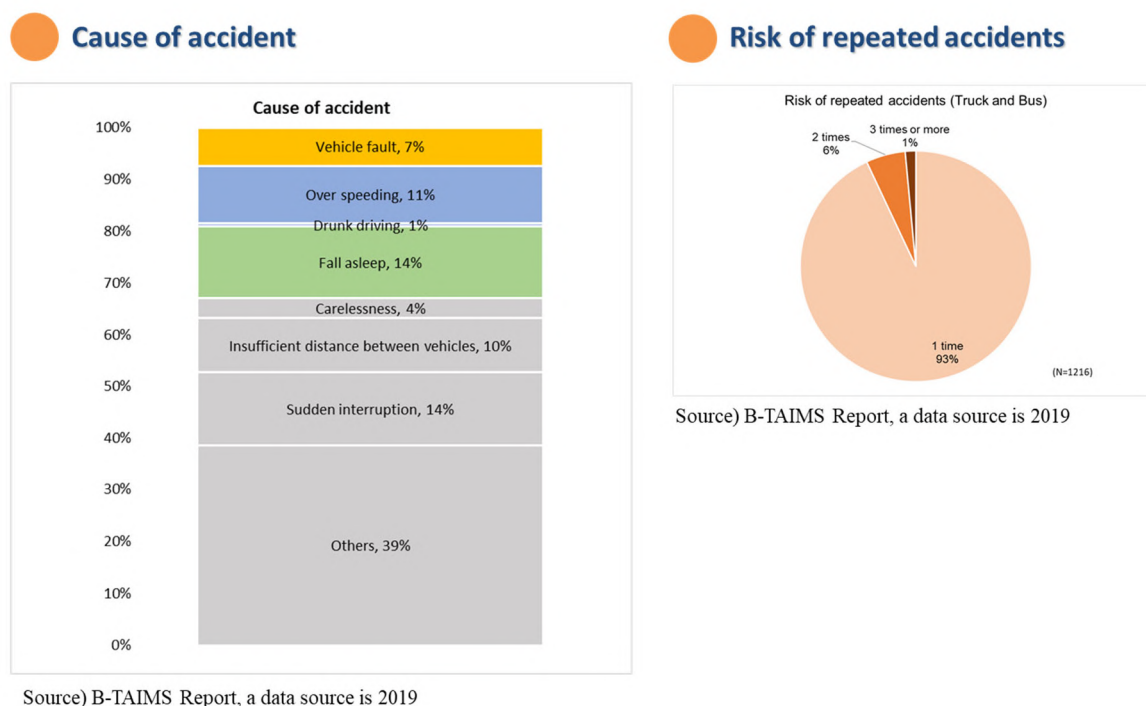
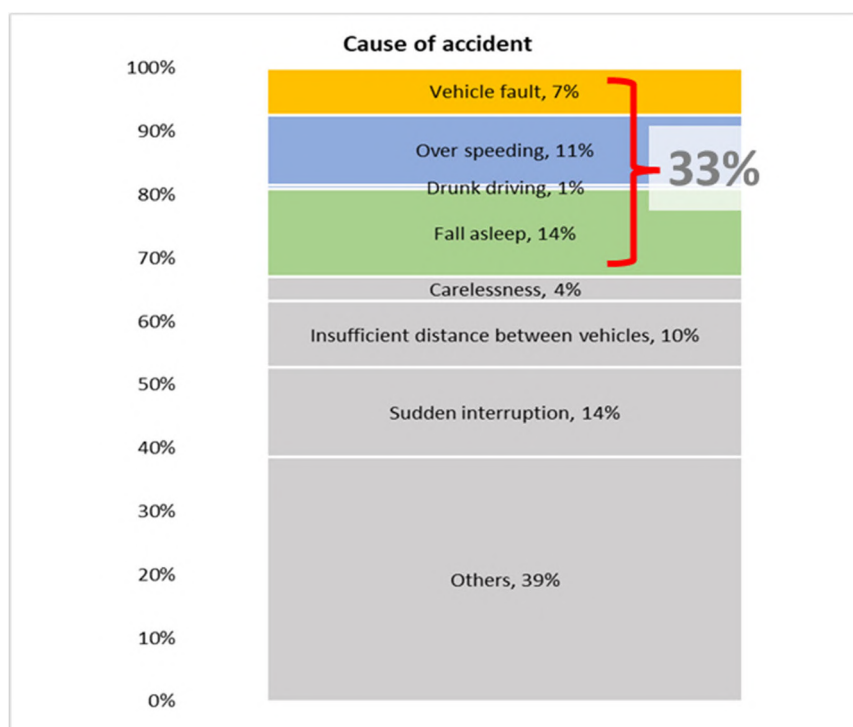


Figure 7.3.51 Cause of Traffic Accidents by Commercial Vehicles

Estimated Accident Reduction Effects

Approaches to Reducing Commercial Vehicle Accidents

Speed and traffic violations were reduced, and the drivers' understanding of TSM operations was confirmed through the TSM pilot project. When safe operation management is thoroughly implemented, daily vehicle inspections are conducted, and driver health is checked through roll calls. As a result, 33% of the causes of accidents are expected to be improved.

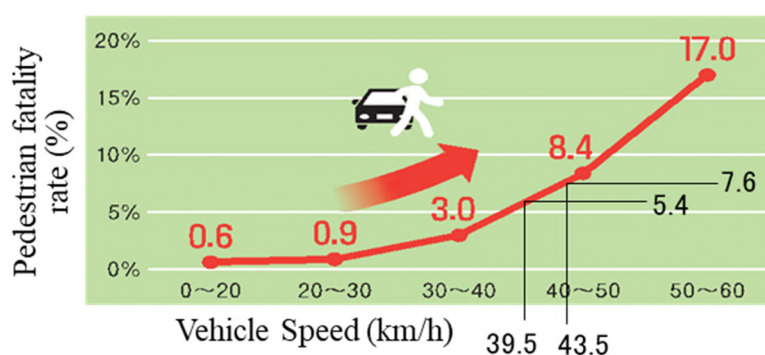


Source) B-TAIMS Report, a data source is 2019

Figure 7.3.52 Causes of Accidents by Commercial Vehicles

Estimated reduction in fatal accidents

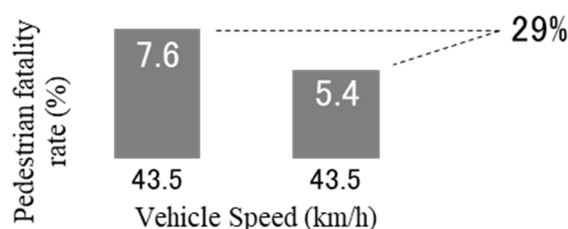
The speed of private trucks, accounting for 80% of commercial vehicles, decreased from 43.5 to 39.5 km/h before and after the pilot project. Based on the relationship between vehicle speed and pedestrian fatality rate, the fatality risk decreases from 7.6% to 5.4% when a truck and pedestrian collide.



Source: Japan National Police Agency Data

Figure 7.3.53 Relationship between Vehicle Speed and Pedestrian Fatality Rate

Reducing vehicle speed is estimated to reduce the fatal risk by 29%.



Source: JET

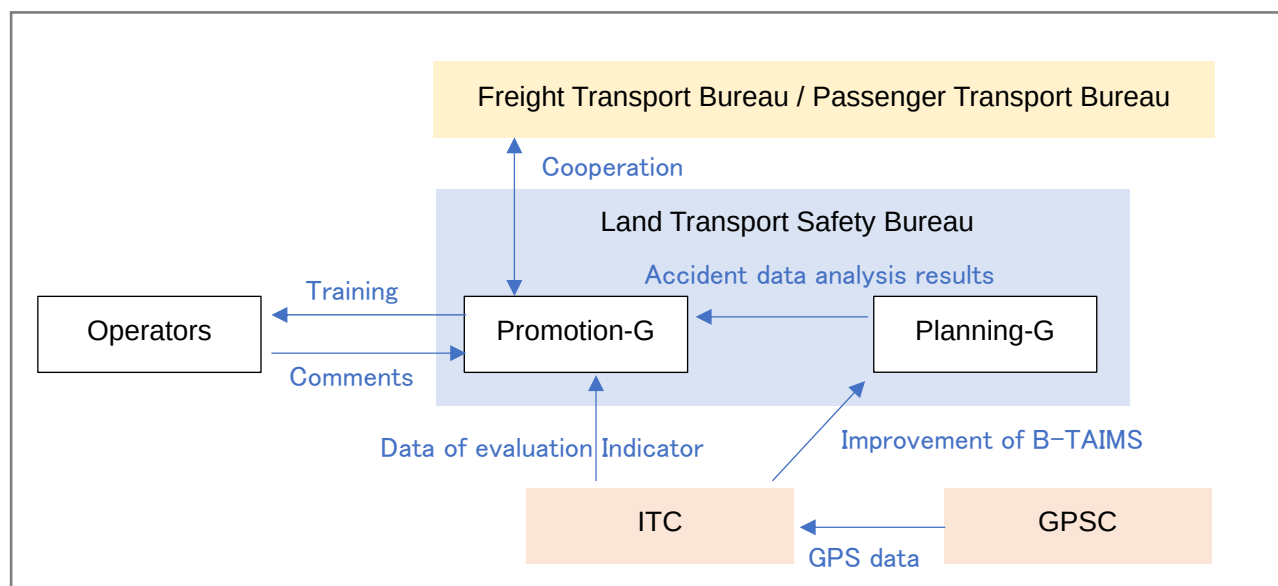
Figure 7.3.54 Estimated of the Fatal Risk Reduction

(9) Way Forward after Project Completion

As previously mentioned, DLT prepared the necessary manual for operators to implement safe operation management in this project. In addition, an organizational structure was established to promote the TSM system, as shown in Figure 7.3.55.

After completing this JICA Project, DLT shall implement the following activities.

1. Monitoring of operators
2. Improvement of the TSM manual based on item 1
3. Improvement of the TSM system based on item 1



Source: DLT

Figure 7.3.55 Implementation Structure of TSM Work

7.4 List of Technical Document

Technical documents created through activities in Output 4 is shown in below.

Table 7.4.1 Technical Cooperation Preparation Documents Related to Outcome 4

No.	Title	Reference No.
Driving License System		
1	Motorcycle safety driving training textbook for high school students	TD4-1
2	Motorcycle safety driving training manual for instructors	TD4-2
3	Proposal of Re-education Program for Traffic Offenders and the License Renewers	TD4-3
Transport Safety Manager System		
4	TSM Daily Operational Guidelines	TD4-4

Questionnaire for Student who will take a Motorcycle Training Course (Pre-Training Survey)

1. Preface

This is a questionnaire for the participants of the motorcycle training course for high school students.

More than 17,000 people are dead in traffic accidents in a year in Thailand. More than half of deaths are caused by motorcycle accidents and one third of them are caused by drunk driving. The situation is one of the worst in the world.

We don't collect any personal information like IP addresses. Your answer shall be treated statistically and used only for future traffic Your answer shall be treated statistically and used only for future traffic safety activities.

2. Questions

2.1 About Respondent Attributes

- Sex.
- Age.
- Whether he has a driving license or not.
- My motorcycle driving experience.
- Family's driving license acquisition status
- My family is driving a motorcycle.

Necessity of riding a motorcycle

- **Is it necessary for me to ride a motorcycle?**
 - Necessary to secure my family income
 - Necessary for commuting to my school
 - Necessary to live in the neighborhood for playing with friends, shopping, etc.
 - Necessary to go far on a motorcycle
 - Necessary to have a fan with riding a motorcycle
 - Unnecessary to ride a motorcycle because of risks of traffic accidents.
 - No particular purpose
 - Others

Obtaining a driving license

- **Is it necessary to obtain a driving license?**
 - Getting a driving license to ride a motorcycle is a matter of course.

Project Completion Report

- Since my part-time job requires me to get a driving license and I have no choice.
- I am not going to get a driving license because it is easy to drive a motorcycle and I can ride a motorcycle without getting a driving license.
- My family told me to get a driving license.
- Others

Behavior of riding a motorcycle

- **How do you behave when you ride a motorcycle?**
 - Wearing a helmet
 - Wearing long sleeve shirts and long pants
 - Wearing shoes, no sandals
 - Keeping driving left
 - No driving on pedestrians
 - Obeying speed limits
 - Obeying traffic signals
 - No illegal modifications (e.g. with rear view mirrors, etc.)
 - No two or more passengers
 - Touch or look smartphones only when stopping
 - No drinking and No drugs

About traffic accidents

- **Have you been involved in traffic accidents?**
- **Have your family members been involved in traffic accidents or have caused traffic accidents?**
- **What are the main causes of traffic accidents, do you think?**
 - Unlicensed driving
 - Drunk driving
 - Smartphone driving
 - Driving on foot paths or driving opposite directions
 - Over speeding or ignoring traffic signals
 - Child motorcycle drivers (elementary and secondary school students)
 - Not wearing helmets or removing rearview mirrors
 - Sidesaddle riding on a motorcycle
 - Bad pavement or danger structures of intersections
 - No first aid for victims or late coming of emergency cars
 - A lot of drivers just consider motorcycles will run if they just squeeze the throttles.
 - It would be fates of the victims and they should be accepted.
 - Others
- **Who are most responsible for traffic accidents, do you think?**

- Traffic violators
- Traffic police officers, who don't seem to expose traffic violators
- Parents and schools, who allow their children to drive motorcycles
- Road managers, who constructed dangerous-to-use roads
- Adults, who allow drunk driving and unlicensed driving in the society
- Young people, who enjoy danger driving like over speeding
- Governments, whose traffic safety campaigns are out of our sights or not effective
- A lot of motorcycle drivers have poor driving skills and cause traffic accidents.
- People in general, who don't care the traffic accident victims on the road and don't give them any first aid
- Drivers who lack sufficient driving ability
- No one is responsible for traffic accidents because of God's acts
- Others

About traffic safety

- **What are necessary actions for traffic safety, do you think?**

- Traffic accidents are caused by people, and we can prevent them with our efforts.
- Traffic violators must be exposed by traffic police officers strictly. repeat offenders should be punished severely.
- Parents and schools who allow their children to drive motorcycles must consider another way not to drive motorcycles anymore.
- Road construction should consider the usage of local people, not to make them drive opposite directions or to prevent danger intersections.
- Motorcycle driving training courses should be extended widely for every high school student.
- More driving skill trainings for drivers.
- Community people should cooperate and extend traffic safety activities.
- Young people should lead traffic safety activities for future society.
- Government should extend traffic safety activities for driving safety and traffic safety.
- Traffic safety is, after all, just as long as I, my family and friends don't cause or get involved in traffic accidents. It doesn't matter to others.
- Others

Motorcycle Skill Training Course

- **Was it enough?**

- It was enough and I gained confidence in driving.
- I was satisfied with the contents, but experience and improvement after driving on the road are necessary for more safe and skilled driving.

Project Completion Report

- The contents are insufficient, and I would like to get more about driving skills and safe driving.
- I was already familiar with the contents of the course and did not need to attend the course.
- Others
- **Do you want to go to DLT and obtain your license?**
 - I want to make time to go to the DLT office and obtain my driving license.
 - I want to go to the DLT office to obtain my driving license, but I don't have much time.
 - Now that I can drive by myself, I don't have to obtain a driving license.
 - If I will take more training courses, I will be confident with driving and obtain a driving license.
 - Others

[End of Document].

Questionnaire for Student who will take a Motorcycle Training Course (Post-Training Survey)

3. Preface

This is a questionnaire for the participants of the motorcycle training course for high school students.

More than 17,000 people are dead in traffic accidents in a year in Thailand. More than half of deaths are caused by motorcycle accidents and one third of them are caused by drunk driving. The situation is one of the worst in the world.

We don't collect any personal information like IP addresses. Your answer shall be treated statistically and used only for future traffic Your answer shall be treated statistically and used only for future traffic safety activities.

Obtaining a driving license

- **Is it necessary to obtain a driving license?**
 - Getting a driving license to ride a motorcycle is a matter of course.
 - Since my part-time job requires me to get a driving license and I have no choice.
 - I am not going to get a driving license because it is easy to drive a motorcycle and I can ride a motorcycle without getting a driving license.
 - My family told me to get a driving license.
 - Others
- **Do you understand how to drive safely from the training?**
 - I was not confident, but now I am confident that I can drive safely from the training.
 - I was not confident, but now I am confident that I can drive safely from daily driving rather than training.
 - I am confident that I can drive safely since the beginning, and training improve my safe driving skills significantly.
 - I am confident that I can drive safely since the beginning. Training did not improve my safe driving skills significantly.
 - I am not interested in safe driving. i just want to ride the way i want to ride.
 - Others

Behavior of driving a motorcycle

- **How do you behave when driving a motorcycle in a period of one month after training?**
 - Wearing a helmet
 - Wearing long sleeve shirts and long pants

Project Completion Report

- Wearing shoes, no sandals
- Keeping driving left
- No driving on pedestrians
- Obeying speed limits
- Obeying traffic signals
- No illegal modifications (e.g. no removal of rear view mirrors, etc.)
- No two or more passengers
- Touch or look smartphones only when stopping
- No drinking and No drugs

About traffic accidents

- **Have you been involved in traffic accidents in a period of one month after training?**
- **After training, do you think what are the main causes of traffic accidents?**
 - Unlicensed driving
 - Drunk driving
 - Smartphone driving
 - Driving on foot paths or driving opposite directions
 - Over speeding or ignoring traffic signals
 - Child motorcycle drivers (elementary and secondary school students)
 - Not wearing helmets or removing rearview mirrors
 - Sidesaddle riding on a motorcycle
 - Bad pavement or danger structures of intersections
 - No first aid for victims or late coming of emergency cars
 - A lot of drivers just consider motorcycles will run if they just squeeze the throttles.
 - It would be fates of the victims and they should be accepted.
 - Others
- **After training, do you think who are most responsible for traffic accidents?**
 - Traffic violators
 - Traffic police officers, who don't seem to expose traffic violators
 - Parents and schools, who allow their children to drive motorcycles
 - Road managers, who constructed dangerous-to-use roads
 - Adults, who allow drunk driving and unlicensed driving in the society
 - Young people, who enjoy danger driving like over speeding
 - Governments, whose traffic safety campaigns are out of our sights or not effective
 - A lot of motorcycle drivers have poor driving skills and cause traffic accidents.
 - People in general, who don't care the traffic accident victims on the road and don't give them any first aid
 - Drivers who lack sufficient driving ability
 - No one is responsible for traffic accidents because of God's acts

- Others

About traffic safety

- **After training, do you think what are the necessary actions for traffic safety?**
 - Traffic accidents are caused by people, and we can prevent them with our efforts.
 - Traffic violators must be exposed by traffic police officers strictly. repeat offenders should be punished severely.
 - Parents and schools who allow their children to drive motorcycles must consider another way not to drive motorcycles anymore.
 - Road construction should consider the usage of local people, not to make them drive opposite directions or to prevent danger intersections.
 - Motorcycle driving training courses should be extended widely for every high school student.
 - More driving skill trainings for drivers.
 - Community people should cooperate and extend traffic safety activities.
 - Young people should lead traffic safety activities for future society.
 - Government should extend traffic safety activities for driving safety and traffic safety.
 - If I, my family, and my friends do not cause or get involved in traffic accidents. it doesn't matter to others.
 - Others

Motorcycle Skill Training Course

- **Was it enough?**
 - It was enough and I gained confidence in driving.
 - I was satisfied with the contents, but experience and improvement after driving on the road are necessary for more safe and skilled driving.
 - The contents are insufficient, and I would like to get more about driving skills and safe driving.
 - I was already familiar with the contents of the course and did not need to attend the course.
 - Others
- **Do you know the severity from the accident if you driving motorcycle improperly?**
Possible Severities are as follows
 - ✓ There is a possibility that I may be injured and require medical treatment or hospitalization.
 - ✓ In the case of a serious injury, there is a possibility that I may be left with physical or mental disabilities that will cripple me for the rest of my life.

Project Completion Report

- ✓ There is a possibility that I may die.
- ✓ Grieve my family.
- ✓ Grieve your friends and school teachers.
- ✓ In the event of an injury, I may not be able to work part-time, affecting my allowance and family finances.
- ✓ If injured, I may incur medical and hospitalization costs.
- ✓ If injured, my parents or siblings may be unable to work to care for me, which may affect my family finances.
- ✓ If a serious injury leaves one physically or mentally disabled, my work may be limited or my income may be reduced due to the inability to work, and I may be forced to live on the assistance of family members or relatives for the rest of my life.
- ✓ If their motorcycle breaks down, they may need money to repair it or buy a new one.
- ✓ I understand that the prior risks are not only apply to myself but also apply to the other party and my passengers. I may take responsibility for the risk that happen to them.
- ✓ The liability could be tens of millions of baht in the event of death of the other party to the accident or passenger on your motorcycle, or in the event of a loss to the other party's company, etc.
- ✓ If the accident was caused by gross negligence, you yourself may be arrested and held criminally liable.

- Yes, I know and understand all these risks. (13 of 13)
- I know and understand most of these risks. (more than 9 of 13)
- I know and understand these risks partially.
- I barely know and understand these risks.(more than 3 of 13)
- No, this is the first time to recognize the risks (0 of 13)
- I don't care such risks. I can't drive a motorcycle if I think about the risks.
- Traffic accidents are fate, and it is not advisable to pursue responsibility for them when they happen. People should accept it as it is.

• **Do you want to buy insurance after acknowledge these risks from the accident?**

- Yes, I am willing to buy insurance
- Yes, I want to, but buying insurance is economically difficult for me
- No, the possibility of accident is so small with my driving so it is unnecessary to buy insurance
- No, I don't care such risks. I can't drive a motorcycle if I think about the risks.

- No, Thai people have traditions to support each other in families. People who are involved in traffic accidents should go back to their home and get support in their families. People who are involved in traffic accidents should go back to their home and get support in their families.
- **Do you know the benefits of wearing helmets when you drive a motorcycle or ride a motorcycle as a passenger? Possible Severities are as follows**
 - ✓ Half of all deaths from motorcycle accidents are due to head injuries. (The second is chest injuries, which account for about a quarter.)
 - ✓ Without a helmet, you are about twice as likely to die in a motorcycle accident.
 - ✓ Just wearing a helmet is not effective; the chinstrap must be properly secured.
 - ✓ If you are involved in a car accident without wearing a helmet, the insurance coverage may be reduced as a serious defect in your driving.
 - ✓ Helmets must have the Thai Industrial Standard (TIS) mark.
 - ✓ The impact of an accident driving at 30 km/h is about the same as a fall from a 3- or 4-story building; at 40 km/h, about the same as a fall from a 5-story building; and at 80 km/h, about the same as a fall from a 14-story building. and at 80 km/h, about the same as a fall from a 14-story building.
 - ✓ Not only TIS, but also Japanese, U.S., and European standards, as well as the most stringent racing standards, require that helmets be designed and manufactured to stand an impact of 30 km/h. Impacts exceeding 30 km/h must be received by the body of the motorcycle or by other body parts besides the head, and if these cannot absorb all impacts exceeding 30 km/h, then the helmets must be designed and manufactured to withstand an impact of 30 km/h. Impacts exceeding 30 km/h must be received by the body of the motorcycle or by other body parts besides the head, and if these cannot absorb all impacts exceeding 30 km/h, the helmet will be subjected to impacts above 30 km/h, resulting in helmet breakage and head damage. The following measures can be taken to prevent impacts of more than 30 km/h from acting on the head in the event of an accident
 - ✧ Reduce speed as much as possible.
 - ✧ Ensure that you can properly make an emergency braking.
 - ✧ Drive with the correct posture.
 - ✧ Wear gloves, long-sleeved jackets, long pants, and sneakers so that the impact can be absorbed by the clothing.
- Yes, I know and understand all these risks. (7 of 7)
- I know and understand most of these risks. (more than 5 of 7)
- I know and understand these risks partially.
- I barely know and understand these risks. (more than 1 of 7)
- No, this is the first time to recognize the risks (0 of 7)

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- The advantages of wearing a helmet are irrelevant to me. For me, the best thing about driving a motorcycle is to feel the wind in my face and drive briskly, and For me, the best thing about riding a motorcycle is to feel the wind in my face and drive briskly, and I don't need a helmet to get in the way of that.
- Even with helmets on, when accidents happen, they happen, and when accidents kill me, I die. Wearing a helmet is just too much trouble for me. Don't preach to me anymore.

[End of Document].

8 Project Review

8.1 Objectives

The objectives of the project review are as follows:

- to review the project outputs and achievements based on the PDM,
- to understand both positive and negative factors that affected the implementation process,
- to extract lessons learned that can be applied to other projects, and
- to clarify action plans by Thai C/Ps to achieve the overall goal of the Project after its completion.

8.2 Outputs and Achievements

8.2.1 Evaluation Indicators for Each Output

Output 1 : The reliability and utilization of New Transport Road Accident Management System (New-TRAMS) are improved.

- **1-1: The difference between the New-TRAMS and MOPH data (3-base data) on road fatalities is retained within 10%.**

TSOC has developed the New-TRAMS through project activities. New-TRAMS contains traffic accident data on the road network under the responsibility of MOT. Therefore, the number of road fatalities in New-TRAMS should be compared with data from other traffic accident databases that can classify the location of the accident site.

The MOPH data (3-Base Database) has incomplete location information, only about 50% of traffic accidents. Therefore, a comparison with the 3-Base Database is not possible. In addition, while MOI's traffic accident database includes location information, its data is only from the Songkran and New Year festivals; however, it is considered one of the most reliable/complete data. For this reason, the difference between New-TRAMS and MOI data on road fatalities during Songkran at road networks under the responsibility of MOT was compared. The difference was 10.4% in the base year of 2019, and it became 6.2% in 2024.

Table 8.2.1 Number of Traffic Accident Fatalities (TRAMS and MOI Data)

Year	Number of Traffic Accident Fatalities on Roads under Jurisdiction of MOT		
	MOT	MOI	Difference
7 Days during Songkran in 2019	267	298	10.4%
7 Days during Songkran in 2024	227	242	6.2%

Source: TSOC

- **1-2: In addition to the number of road fatalities, the New-TRAMS contains the necessary items such as accident location, accident pattern, collision code, driver's behavior, etc.**

Through the activities of the Project, improvements have been made to New-TRAMS, which integrates accident data from organizations under the MOT. Each organization under the MOT also owns and utilizes an accident database, and since it would be impractical to completely rebuild the database, the project team focused on creating a common accident report format. The common accident report format for MOT was created, containing the abovementioned necessary items as well as "seating position," "purpose of journey," etc. TSOC improved New-TRAMS containing 113 data items, including those in the common accident report format. It has been developing automation for data transferring to the New-TRAMS.

Furthermore, the same items were also applied in the new traffic accident data form of the RTP.

- **1-3: Six cases of in-depth accident analysis including motorcycle accidents are implemented.**

The series of training on accident data analysis and in-depth accident analysis were conducted by JET. TSOC conducted seven cases of in-depth accident analysis including motorcycle accidents and summarized them in reports. Another Traffic accident data analysis using New-TRAMS was divided into six themes, such as motorcycle accidents, and was also conducted and summarized into quarterly reports.

Output 2 : The countermeasures for safer road engineering are developed and implemented through the activities in the pilot sections on National Highways and/or Motorways.

- **2-1: The countermeasures for safer road engineering at 3 black spots in the pilot sections on National Highways and/or Motorways are implemented.**

Countermeasures were studied and prepared for five black spots in Nakhon Ratchasima, Suphan Buri, Samut Sakhon, and Prachin Buri Provinces. Short-term measures were implemented in three out of five pilot sections, in which two pilot sections are in Suphan Buri and one in Samut Sakhon. DOH will implement the measures in two pilot sections where no measures have been implemented during the project and medium-term measures in two out of three pilot sections where short-term measures were implemented in 2024 and 2025.

- **2-2: The self-rating of MOT staff's capability on road safety engineering for National Highways and/or Motorways exceeds 70% on average.**

A self-evaluation indicator of 70% or above has been set to evaluate whether the majority of the staff who participated in this project acquired the necessary knowledge and skills for road countermeasures through the project activities. DOH staff attended lectures, OJTs, and workshops for data analysis, improvement planning, and evaluation through the project activities. They also had an examination on road safety engineering, with scores averaging 82%. This result shows that the majority of DOH staffs who participated in the project understood knowledge and acquired skills.

Output 3 : Comprehensive road safety programs on the Rural and/or Local Roads are implemented in the pilot areas.

- **3-1: Three out of three black spots and risk spots on Rural Roads and/or Local Roads in the pilot areas are improved.**

Pilot projects, including road facility improvement, were implemented in three locations, Nakhon Ratchasima, Suphan Buri, and Samut Sakhon Provinces, to improve areas where traffic accidents frequently occur.

- **3-2: The self-rating of local police in the pilot areas conducting enforcement activities exceeds 70% on average.**

A self-evaluation indicator of 70% or above has been set to evaluate whether the majority of the staff who participated in this project acquired the necessary knowledge and skills for road countermeasures through the project activities. Police officers had a self-evaluation. They participated in the training in the first year, as well as in the pilot projects in the second and third years. Three evaluation indicators were assessed: clear instruction, positioning of police officers during operations, and polite response. The average self-evaluation results on these three indicators were 87%, 83%, and 100% in Nakhon Ratchasima, Suphan Buri, and Samut Sakhon Provinces, respectively. This result shows that the majority of RTP staffs who participated in the project understood knowledge and acquired skills.

- **3-3: Satisfaction rating of local residents on safety programs for vulnerable road users including children and their parents as well as agricultural vehicle drivers are carried out in the pilot areas.**

Three pilot projects were carried out with residents and children, and satisfaction surveys were conducted for each. In the three pilot areas of Nakhon Ratchasima, Suphan Buri, and Samut Sakhon provinces, 72%, 92%, and 100% of respondents, respectively, stated that "traffic safety awareness and compliance with traffic rules had improved."

Output 4 : Land transport administration for road safety on driver licensing and operation management for commercial vehicle is improved.

- **4-1: The improved licensing system is approved by the MOT.**

As the DLT approves the driver's license system and not MOT, the project team supported creating a textbook and instructor's manual for a motorcycle driving course for high school students. After receiving approval from DLT, it was used in the pilot projects.

- **4-2: 3 Inspections for safety operation management to commercial vehicle operators including medium and small operators are implemented.**

DLT created an implementation manual for the operation manager system and used it to promote the transport safety manager system among 29 operators. Following this, DLT inspected the safety operation management of three operators at their respective offices.

8.2.2 Evaluation Indicator for the Project Purpose

Project purpose: The capacity improvement of road traffic safety institutions and implementation is realized.

- **Indicator: The number of fatalities by road traffic accidents in the areas intervened by the project is reduced 30% from 2019 to 2024.**

There are eight target areas, including five pilot project sections on the DOH highway in Output 2 and three pilot project sections and intersections on the DRR road in Output 3. The effectiveness of the countermeasures to contribute to reducing more than 30% of traffic fatalities in the pilot sections and areas was verified and estimated through the pilot project.

On the other hand, the effectiveness of traffic accident countermeasures is generally verified by the number of traffic accidents over a 4-to-5-year period. In this project, the number of accidents in 2019 is compared to that in 2024, the year the project ends. However, this period is short, and the verification may not be fair. Therefore, the number of traffic accidents that occurred in the pilot project sections or areas from 2018 to 2022, as shown below, is incorporated so Outputs 2 and 3 include data for the five years before the implementation of the pilot projects. The data for 2024 will be tallied in 2025, and it will be evaluated after the project ends.

Table 8.2.2 Number of Traffic Accident Fatality and Accident on DOH Pilot Sections (Output 2)

Province	Pilot Section		Category	2018	2019	2020	2021	2022	Total	Implementation
Nakhon Ratchasima	Km242+730-Km242+835, NH304	Straight + Normal Curve	Fatality (pers.)	0	0	0	0	0	0	Not yet implemented.
			Fatal accident (nos.)	0	0	0	0	0	0	
			Total accident (nos.)	32	6	4	8	8	58	
Suphan Buri	Km119+000-Km120+000, NH340	Straight, U-turn, T-junction	Fatality (pers.)	1	0	0	1	0	2	Short-term measures were implemented in March 2024
			Fatal accident (nos.)	1	0	0	1	0	2	
			Total accident (nos.)	1	3	1	5	4	14	
Samut Sakhon	Km18+500 - Km19+500, NH3091	Straight, Crossing	Fatality (pers.)	0	0	1	0	0	1	Short-term measures were implemented in March 2024.
			Fatal accident (nos.)	0	0	1	0	0	1	
			Total accident (nos.)	4	1	3	1	0	9	
Prachin Buri	Km102+700-Km103+300, NH321	Normal Curve on sharp	Fatality (pers.)	0	13	8	2	5	28	Not yet implemented.
			Fatal accident (nos.)	0	9	8	2	5	24	

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		slope	Total accident (nos.)	1	40	29	32	54	156	
Samut Sakhon	Km102+700 - Km103+300, NH321	Straight U-turn, T-junction	Fatality (pers.)	0	0	1	0	0	1	Most of planned measures were implemented in April 2024.
			Fatal accident (nos.)	0	0	1	0	0	1	
			Total accident (nos.)	0	3	6	5	3	17	
Total			Fatality (pers.)	1	13	10	3	5	32	
			Fatal accident (nos.)	1	9	10	3	5	28	
			Total accident (nos.)	38	53	43	51	69	254	

Source: New-TRAMS

Table 8.2.3 Number of Traffic Accident Fatality and Accident on DRR Pilot Areas (Output 3)

Province	Pilot Section		Category	2018	2019	2020	2021	2022	Total	Implementation
Nakhon Ratchasima	Km 0 +000 - Km 69+500, NH3052	Curve section	Fatality (pers.)	0	0	3	2	1	6	Implemented in November 2022.
			Fatal accident (nos.)	0	0	3	1	1	5	
			Total accident (nos.)	1	1	35	16	7	60	
Suphan Buri	Km 0 +000 - Km 29+500, NH4059	Intersection	Fatality (pers.)	0	3	1	2	0	6	Implemented in June 2023.
			Fatal accident (nos.)	0	3	1	2	0	6	
			Total accident (nos.)	2	5	1	3	0	11	
Samut Sakhon	Km 0 +000 - Km 7+000, NH5031	Straight section	Fatality (pers.)	1	2	1	0	0	4	Implemented in April 2024.
			Fatal accident (nos.)	1	1	1	0	0	3	
			Total accident (nos.)	6	9	2	0	0	17	
Total			Fatality (pers.)	1	5	5	4	1	16	
			Fatal accident (nos.)	1	4	5	3	1	14	
			Total accident (nos.)	9	15	38	19	7	88	

Source: New-TRAMS

8.3 Overall Goal

The overall goal is, "The fatalities by road traffic accidents are reduced in Thailand." It is believed that utilizing the results of this project over the country will contribute to achieving this goal.

Based on the traffic accident data analysis in Output 1, the characteristics of frequent

traffic accidents on roads under the jurisdiction of DOH and DRR were clarified. This understanding will supplement the expansion of the Project to other provinces. Following this, the pilot project sections and areas were selected in the Outputs 2 and 3 activities, countermeasures were implemented, and their effectiveness was evaluated. Through a continuous cycle of selecting target areas, formulating and implementing countermeasures, and evaluating their effectiveness based on data analysis, the project aims to achieve a continuous reduction in traffic accident fatalities. TSOC analyzed accident data by prefecture, time period, vehicle type, road administration, and other factors to realize a systematic and mid- to long-term approach, which is the background of the Project. TSOC is expected to analyze the traffic accident data, summarize the characteristics of traffic accidents periodically, and formulate a policy for traffic accident countermeasures of MOT. Each department under MOT, such as DOH, DRR, and DLT, follows this policy and implements measures toward the same goal. Its systematic approach would be more effective in reducing road fatalities.

8.4 Lessons and Proposals

8.4.1 Cooperation with Related Organizations

In Thailand, various traffic accident countermeasures have been implemented, but the number of traffic fatalities remains. Cooperation among related organizations is a prerequisite for this project to ensure the implementation of systematic traffic accident countermeasures based on data. At the beginning of the project, to prepare a cooperation system among related organizations, the PCG and four WGs were established as a forum for related organizations to discuss and carry out activities.

The PCG replaced the Monthly Meeting in the second year, allowing related organizations to continue sharing information and proceed with activities.

In the activities of each WG, WG1's efforts to improve the accident database did not result in connecting the database with organizations outside of MOT. However, WG1 cooperated with TSOC, ICTC, DOH, DRR, DLT, and EXAT under MOT to create and agree on a common accident report format within MOT. WG2 collaborated with DOH and Highway Police in the pilot project section, and WG3 collaborated with DRR, RTP, DDPM, local governments, schools, and residents.

In the pilot project implemented by this project, each C/P organization and JET planned

the activity contents and invited relevant organizations in each province to participate. By clarifying the organization that will plan and lead the activity, it is believed that cooperative activities will be continuous. In promoting cooperation activities in each organization, the activities should be carried out systematically by creating policies and programs at the headquarters level of each organization rather than at the local level.

Since TSOC plans to become the national transport safety board independent of MOT in the future, policies and programs for traffic accident countermeasures are expected to be created based on the analysis of the traffic accident data results. Each organization will recognize its role and implement it accordingly. Cooperation between each ministry and agency is necessary for the accident database. This can be realized by issuing implementation instructions from the top level of each ministry and agency.

8.4.2 Relation between Primary Duties of the C/P and Activities in the Project

In this project, four departments under the MOT, namely WG1 by TSOC, WG2 by DOH, WG3 by DRR, and WG4 by DLT, headed the activities.

WG2 focused on improving dangerous spots on roads under the jurisdiction of DOH, and WG4 supported the implementation of the operation manager system that DLT has started to introduce, as well as improving the driver's license system. These activities were in line with the C/P's original duties. Therefore, full cooperation was obtained from the C/Ps.

WG1 aimed to improve the reliability of the traffic accident database. The data sent by DOH, DRR, DLT, and EXAT to ICTC was compiled into an accident database within MOT, and ICTC built the New-TRAMS database. TSOC performs analysis using the New-TRAMS database, but since it takes time to build the database, TSOC is creating a new accident database. For this reason, JET took the initiative to coordinate with related organizations to reach an agreement on creating a common accident format for New-TRAMS.

WG3 worked on a comprehensive road safety program that included not only engineering, which is the responsibility of DRR but also education and enforcement activities. WG3 cooperated with RTP and DDPM. However, as this was not the primary role of DRR, JET initiated involving other organizations and created the program until the very end.

As mentioned above, while the main C/Ps of each WG initiated the activities that fit their original duties, JET had to lead the activities that did not, which made continuity difficult.

Therefore, future projects should include related organizations in the C/Ps.

8.4.3 Measuring the effectiveness of road safety projects and the PDCA cycle

Although various road safety measures have been implemented in Thailand, their effectiveness has not been adequately measured. WG2, WG3, and WG4 main C/Ps were DOH, DRR, and DLT, respectively. However, each organization scarcely measured the effectiveness of the implemented measures and could not fully grasp their impact.

WG1 lectured on extraction of focus traffic accident cases and statistical measurement of the effectiveness of measures from traffic accident data analysis based on Japanese cases. WG2 and WG3 assessed the effectiveness of measures by checking any changes in vehicle behavior from video cameras and image analysis software at locations where the road facilities were improved. WG4 measured the effectiveness of motorcycle training for high school students through a questionnaire survey and assessed the operation manager system by tracking changes in the number of violations using GPS devices.

The effectiveness of traffic safety measures is traditionally evaluated by the number of accidents and the number of accident fatalities over 4 to 5 years before and after the measures. However, the above methods were used to measure effectiveness in a shorter period, such as one or two months after the implementation of the measures.

Through the activities of this project, each C/P organization has also learned the method of effect measurement. It is expected that each organization will continue to measure the effectiveness of measures and make significant investments in effective interventions in the future, thereby contributing to the efficient reduction of traffic accidents and fatalities.

8.5 Conclusion

8.5.1 Improvement of Traffic Accident Database

TSOC is the main counterpart of WG1 and was approved as an official division in MOT during the project period. TSOC led WG1 and worked in cooperation with ICTC, which operates New-TRAMS, the traffic accident database within MOT, as well as DOH and DRR, which are road administrators that provide traffic accident data to New-TRAMS, and RTP, which investigates traffic accidents.

Regarding Output 1, MOT improved the New-TRAMS, which includes necessary data items. The improved New-TRAMS includes accident data on roads within the jurisdiction of MOT. In parallel with the improvement of New-TRAMS, a common traffic accident report format was agreed upon within MOT, and an agreement was reached with related organizations to improve the reliability of the New-TRAMS traffic accident database.

WG1 extracted characteristic traffic accident types in each pilot province from the results of the accident data analysis using New-TRAMS and selected pilot project sections/areas for WG2 and WG3. This is recognized as one of the systematic activities in which related organizations cooperated using the traffic accident database.

Although cooperation between MOT and RTP did not go smoothly, JET played a central role in lobbying RTP and held a workshop on traffic accident data analysis for RTP. A certain level of understanding is believed to have been gained about the importance of accident databases and how to utilize them. As proof of this, the items proposed in the common accident report format were also included in the RTP accident data form.

8.5.2 Engineering Measures

Technical capacity enhancement of DOH staff was achieved through systematic activities, including accident data collection, data analysis, countermeasure consideration, design, implementation, and evaluation for each pilot section on DOH roads. In the pilot project, road facility improvements were considered for five sections with high traffic accident rates (pilot sections), and short-term countermeasures were implemented for three of those sections. Although only a portion of the planned countermeasures were implemented for the three sections, the core focus was reducing the traffic accident risk through changes in vehicle behavior.

In addition, the technical capabilities of the staff in charge of this Project have improved, indicating a certain level of effectiveness as also demonstrated by the evaluation results of DOH staff. Besides considering countermeasures for the five pilot sections, the Good Practice Guide was also created based on countermeasure examples in Thailand, including those that have been implemented by DOH.

As mentioned above, it is expected that safety measures for road facilities will be promoted by utilizing this guideline in conjunction with road development in accordance with road design standards.

8.5.3 Comprehensive Road Safety Program

A comprehensive road safety program consisting of the 3Es (Engineering, Enforcement, and Education) was implemented in three areas, including DRR roads. DRR was the main C/P, and the study and implementation of engineering-related measures went smoothly. However, enforcement and education were implemented in collaboration with RTP, DDPM, and other organizations, as they were not under the jurisdiction of DRR. The evaluation and change in awareness of the participating police officers and residents were high, and no traffic accidents have been reported in the pilot project areas so far. From these results, it is recognized that the pilot project had a certain effect.

On the other hand, although this project was under the leadership of JET, an organization that will lead this program is needed for continued implementation of activities that include different elements. It is necessary to organize the leading implementation of this activity between MOT and related organizations.

8.5.4 Land Transport Administration related to Driving License System and Transport Safety Manager System

Regarding the driver's license system, in cooperation with DLT, as well as the Ministry of Education, RTP, and the Automotive Manufacturers Association of Thailand, the high school program and textbook for safe driving courses were improved. In addition, as shown by the questionnaire survey results in the pilot project, the perceptions of the participants changed significantly before and after partaking in the course, confirming effectiveness. Since unlicensed drivers have no opportunity to such courses, increasing the number of participants in motorcycle courses for high school students conducted by DLT is expected to increase the chances of obtaining motorcycle licenses and knowledge of drivers.

As for the transport safety manager system, particularly from DLT that should be introduced, a pilot project was carried out to create guidelines and verify their effectiveness. As shown by the verification of the effectiveness of the pilot project, a decrease in violations were confirmed. The transport safety manager system, at present, targets large- and medium-sized businesses. Small businesses will also be included by next year. In Japan, it is difficult for only the Ministry of Land, Infrastructure, Transport and Tourism to inspect and audit many businesses, so this is carried out by associations and

other organizations. Based on these cases, further system design is required for an effective traffic manager system.