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THE PROBLEM OF EXCESSIVE LOADING OVER THE LEGAL LIMIT AND APPROPRIATE MEASURES TO CONTROL LOAD WEIGHT

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Abstract

This research aimed to study the management problem of the Office of Highways Vehicle Weight Control, Department of Highway, also modern and standard and universal guidelines to input big data and other transportation-related technologies to be able to improve relevant regulations, orders, and announcements of the highway director-general, resulting in increased efficiency. Furthermore, the research aimed to suggest appropriate and cost-effective solutions for the management of the Office of Highways Vehicle Weight Control. The data were collected from at least 50 samples by interviews. The results revealed that the problem of excessive loading on highways was caused by vague and out-of-date laws.

Keywords: Overloaded Truck, Highway, Office of Highways Vehicle Weight Control, Excessive Loading Over the Legal Limit, Control Load Weight

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Introduction

Overloading vehicle mostly occurs in developing nations such as Africa and Asia (Shahi & Nepali, 2020; Mumu & Frauenfelder, 2017; Organisation for Economic Co-operation and Development, 2017). Consequently, it leads to serious accidents that cause death and serious injury. In Thailand, the current efficient highway networks covering over 70,000 kilometers across the country under the supervision of the Department of Highways enable business operations to be conducted with domestic shipping by trucks. The number of those trucks accounts for more than 70 percent of all shipping. The vast number of such trucks inevitably drive entrepreneurs to be price-competitive by adopting various policies that will help them cut shipping costs, even attempting to reduce shipping costs by excessive loading over the limits prescribed by laws. This causes not only premature damage on roads and bridges but also a number of road accidents. Each year, the Department of Highways is therefore required to maintain more roads and bridges than it should have. Moreover, the establishment of the ASEAN Economic Community (AEC) will likely result in an increase in regional shipping as well as the number of trucks in the future.

With that issue in mind, the Office of Highways Vehicle Weight Control has missions and functions to conduct planning on vehicle weight control, consider and propose construction of weigh stations in different areas, set forth standards and requirements on vehicle weight restrictions so that they are up-to-date and consistent with the laws, as well as put forward active policies in collaboration with other agencies in order to undertake publicity and awareness-raising activities relating to loading within the legal limits. Nonetheless, the issue of excessive loading over the legal limits is still not addressed sufficiently. In the past, despite the Department of Highways and the Office of the Highways Traffic Weight Control's efforts to increase the number of weigh stations, all the areas have not been covered as they should have been due to the lack of equipment, budget, and personnel. As such, in order to ensure effective and internationally-standardized supervision of vehicle weight control, it is necessary to conduct a study on the appropriate approach of vehicle weight control on highways in light of the current situations, future trends, and foreign countries' experiences and best practices. This is so that the plans to tackle this problem of excessive loading over the legal limits can be further conducted in an effective manner.

With the view to effectively solving the problem concerning trucks' weight control, the Office of Highways Vehicle Weight Control (OHTWC), under the supervision of the Department of Highways (DOH), is required to study the nature of the problem concerning the management of the Office of Highways Vehicle Weight Control, the Department of Highways. Also, it studies an up-to-date, standardized, and universal approach of Big Data input and other technologies relating to transportation so that other relevant regulations, directives, and the Highway Director's Notifications can be amended accordingly, thus resulting in more efficient performance in the Office of Highways Vehicle Weight Control, Department of Highways. Furthermore, the research aims to perform duties, as Consulting Committee members in the Working Group on Consultation in the management of the Office of Highways Vehicle Weight Control, Department of Highways as well as making suggestions on how to provide an appropriate and cost-effective solution for the management of the Office of Highways Vehicle Weight Control so that it can put forward active policies in line with the nation's long-term strategies. These topics can be applied to solve the problem of excessive loading over the legal limits efficiently, concretely, and sustainably in the future.

Literature Review

Laws Related Track Loading

The Land Traffic Act 1979: The Land Traffic Act 1979 was drafted due to the growing of communication and land transportation throughout the country and neighboring countries. The number of vehicles on roads and highways increases respectively. Furthermore, Thailand becomes a party to Convention on Road Traffic and Protocol on Road Signs and Signals. Therefore, the land traffic law which has been enforced for a long time is amended to suit traffic conditions and the increasing number of vehicles and to be safe for the lives, bodies, and properties of the general public.

However, vehicle weight control is not specified in the Land Traffic Act 1979 but specified in the ministerial regulation which is used to monitor and control vehicles to ensure safety, and provide rules about driving, loading, and using speed, prohibitions, and others. The major issues are as follows;

1) Loading rules: No truck shall exceed the height of 3.00 meters from the road surface, except a truck with a width exceeding 2.30 meters that shall not exceed the height of 4.00 meters from the road surface (Ministerial Regulation No. 26, 1984 issued under the Automobile Act, 1979). A trailer truck shall not exceed the height of 4.20 meters from the road surface (Ministerial Regulation No. 9, 1980 issued under the Land Traffic Act 1979.).

2) Speed limits: A truck with a loading weight exceeding 1,200 kilograms shall be driven in Bangkok areas, Pattaya areas, or municipal areas not exceeding 60 kilometers per hour, or 80 kilometers per hour outside such areas (Ministerial Regulation No. 26, 1984 issued under the Automobile Act, 1979). A truck while being used to tow a trailer shall be driven in Bangkok areas, Pattaya areas, or municipal areas not exceeding 45 kilometers per hour, or 60 kilometers per hour outside such areas. No truck carrying hazardous materials driven on Chalem Maha Nakhon Expressway, Sirat Expressway, and Chalong Rat Expressway shall exceed 60 kilometers per hour, and 70 kilometers per hour on Burapha Withi Expressway and Udon Rathaya Expressway (Ministerial Regulation No. 26, 1984 issued under the Automobile Act, 1979).

Vehicles on Motorway Route 7, Bangkok-Pattaya Motorway and Motorway Route 9 (Kanchanaphisek Road), and Bangkok outer ring roads shall follow speed limits as follows (Ministerial Regulation No. 3, 1999 issued under the Highway Act, 1992.).

2.1) Speed of a truck with a total loading weight not exceeding 1,200 kilograms shall not exceed 100 kilometers per hour (Phetchaburi Provincial Transport Office, 2016).

2.2) The speed of other trucks other than those specified and also a truck or car while towing a trailer shall not exceed 80 kilometers per hour (Phetchaburi Provincial Transport Office, 2016). Apparently, vehicle weight control is not directly specified in the Land Traffic Act 1979 but in the ministerial regulation in which, the way a truck with a total loading weight not exceeding 1,200 kilograms follows speed limits specified by the law is for road safety. If the weight of the truck exceeds what is prescribed by the ministerial regulation and is driven at a speed that does not exceed the limit prescribed by the law, this may affect the safety of the road and also damage the road more quickly.

The Highway Act 1992: In order to keep the highway from being damaged by the weight of trucks, the law is consequently enacted to maintain the highway. The amendment was in 2006 since the law on the highway had been used in enforcement for a long time. Provisions used to control and maintain the highway were inappropriate. Measures used to take action against violators were also ineffective as they should be. It also appeared vehicles with weights exceeding highway limits, causing damage to the highway and the safety of drivers on the highway. Therefore, the law on the highway should be amended in order to be suitable and consistent with the current situation. Furthermore, the Director General of highways or a person assigned by the Director General of highways is authorized in fine settlement for an offense

only liable to a fine and improve penalties to be more suitable. The Highway Act 1992 includes matters regarding vehicle weight control as follows;

1) Definition: In order to take measures of controlling the weight of vehicles not to exceed what is prescribed by the Director General of motorways, it is necessary to understand relevant definitions, including (Section 4, The Highway Act 1992).

1.1) "Truck" means a vehicle used for transporting animals or goods. Its roof is mostly only for the driver's seat. A trunk is blocked by wood or steel plank on the side and back that can be closed and opened. There are ten wheels.

1.2) "Axle" means an axle inserted in a ten-wheel truck's hub to make wheels turn.

1.3) "Transport Entrepreneur" means the natural person/juristic person who engages in the business of transporting goods by using a ten-wheel truck.

2) Vehicles under weight control: "Vehicle" means vehicles under the Motor Vehicle Act and Land Transport Act, including other types of machinery and anything that can move on the highway in the same way.

2.1) Size and Weight of Trucks in Thailand.

2.1.1) 10-wheel truck, the weight of a 10-wheel truck shall be 25 tons according to the announcement on weight limits of the Director General of highways.

2.1.2) 7-axle and 24-wheel truck, the current weight of a 7-axle and 24-wheel truck shall not exceed 50.5 tons according to the announcement on weight limits of the Director General of highways (Department of Highways, 2008).

It can be seen that the announcement of the Director of Highway toward prohibition of heavy vehicles, over excessive loading or weight on the axle exceeds with specified limit or where the vehicle may cause damage to the highway, the first announcement did not limit the weight of trucks. However, the second announcement to the seventh announcement have specified the weight of truck that it must not over 50.5 tons. The eighth announcement of the Director of Highway toward prohibition of heavy vehicles and over excessive loading was launched in July 1, 2014 and the eighth announcement set that total weight of truck driving on highway must not over 50.5 tons.

2.1.3) 22 wheels semi-trailer truck.

Currently, the eighth announcement of the Director of Highway toward 22 wheels semi-trailer truck was published in the Royal Thai Government Gazette. 22 wheels semi-trailer truck was allowed to carry the weight as the following.

2.1.3.1) King Pin 4.50 meter of semi-trailer truck but less than 6 meters and total weight not exceeding 45 tons.

2.1.3.2) King Pin 6 meter of semi-trailer truck but less than 7 meters and total weight not exceeding 47 tons.

2.1.3.3) King Pin 7 meter of semi-trailer truck but less than 8 meters and total weight not exceeding 49 tons.

2.1.3.4) King Pin 8-meter of semi-trailer truck and total weight not exceeding 50.5 tons.

Due to the weight of 50.5 tons, the weight still exceeds the safety standard for the weight of the designed road in Thailand. If the weight of truck is increased to 58 tons, the safety ratio of roads and bridges will decrease from the design standards. In addition, the traffic volume of trucks increased more than expected. It will shorten the service life of roads and bridges (Office of Highways Vehicle Weight Control, 2014).

3) Definition of highway and types of highways: Highway means a road for the public purpose of land traffic whether at ground, below or above ground, or under or above the estate, and includes land, plants, all kinds of plant, bridges, pipes or drainage, tunnels, channels, retaining walls, dams, fences, survey marks, traffic sign distances, traffic sign signal, electrical signalling, parking signal indicator, bus tops, roadside shelter, boat or vehicle for ferry transportation, pier for boarding or buildings or other equipment for road works that exist or

are arranged in the highway area for the benefit of road work or highway users (Section 4, the Highway Act 1992). There are 5 types of highways which comprises of (1) special highways (2) national highways (3) rural highways (4) local highways and (5) concession highways (Section 6, the Highway Act 1992).

Previous Studies Related Track Loading

Petchprasert et al. (2003) reveal that the lifestyle and working conditions of truck drivers are subject to unfair conditions because they need to follow employers' orders to be on time as agreed with clients. Due to the unavailable conditions of trucks and excessive loading, when going through the police checkpoints, drivers need to pay tribute to officers so as to transport goods to their destination promptly.

Chuenwattana (2008) as cited in Pitaksakulthavorn (2020) reveals that the lifestyle and working conditions of truck drivers may be risk factors causing accidents. In other words, in working style, truck drivers are motivated by wages that the more they work, the more they get paid for taking care of their families. Moreover, because they need to work against time, they need to drive at high speed. As a result, this causes a risk of causing accidents. Even though drivers often know that truck conditions are not ready to work, they need wages from employers for making living, and they continue to drive those trucks to transport goods. In the case of rush work, because drivers need to spend more time working, their time for resting decreases due to such reasons. Therefore, drivers deem an accident as normal and an accompaniment of their profession. Thailand Accident Research Center (2011) and Chartsirisup (2006) study the causes and factors affecting truck accidents that there are 3 factors, including humans, vehicles, roads, and environments.

Research Methodology

Firstly, conduct a study and a review of all the relevant studies relating to the Office of Highways Vehicle Weight Control's performance, gather information on problems and consequences resulting from the current administration, gather information on obstacles of the Office of Highways Vehicle Weight Control's undertakings, information on relevant laws, the obstacles when applying up-to-date and internationally-standardized transportation technologies in an effort to enhance the overall efficiency of the Office of Highways Vehicle Weight Control's performance.

Secondly, the relevant data and information was brought to create questionnaire. The questionnaire that created, was validated by 5 experts. Then, the accurate questionnaire employed to collect data with 50 key informants.

Finally, the data was analysed and present the results about appropriate measures in light of the context of the current situation., Then, it makes a summary of the approach on how to solve problems and obstacles of the Office of Highways Vehicle Weight Control's performance.

Research Results and Discussion

The Problem of the Highways Act 1992

The problem arises as the Highways Act 1992 has not been amended to suit the current economic and social conditions, and as a result, entrepreneurs usually feel that it is worth the risk to commit the crimes or that they are not being punished for their crimes. Accordingly, it has been proposed that the legal provisions on the rate of fines under the Highways Act 1992 be revised and amended to suit the country's economic and social conditions, as well as to create a sense of fear for the punishment among the entrepreneurs. Also, this will enable the Highway Director to determine the amount of fine incurred from the violation of offences relating to excessive loading over the legal limits as follows:

- 1) Increase the rate of fine to be imposed on offenders committing excessive loading, as stipulated in the Highway Director's Notification;

- 2) Ensure that the Highway Director is empowered to set forth the criteria and methods of case settlement by payment of a fine;
- 3) Increase the punishment for repeat offenders under section 73/2 paragraph two;
- 4) Provide an additional legal provision criminalizing an offence under 73/2 paragraph that is committed by a juristic person in case where such person has the duty to make an order; or, a commission and omission of making an order; or, a failure to act causes such juristic person to commit a crime. If this is the case, such person shall be punished with a sentence provided for such offence.

Cases concerning vehicles outside the scope of the Categories 1 and 2 of the Notification issued by the Special Highway Director, the National Highway Director, and the Concession Highway Director; or other vehicles in Category 3

Vehicles with weight, load weight, or axle weight exceeding the specified limits, or vehicles that may cause damage to the highways, which are driven on special highways, national highways, and concession highways, apart from those stipulated in Categories 1 and 2, if satisfying the terms specified in Category 3 and carrying excessive load and axle weights over the specified limits, are prohibited from being used and driven in a way that may cause damage to highways, on special highways, national highways, and concession highways, except when it is permitted under the criteria proclaimed and prescribed by the Highway Director. It can be seen that other requirements stipulate that vehicles of different characters in Category 3 with load weight or axle weight exceeding the specified limits must comply with the Criteria on the Permission to Have Vehicles Driven on Special Highways, National Highways, and Concession Highways (Department of Highways, 2008).

Under the Notification of the Special Highway Director, the National Highway Director, the Concession Highway Director as of 22 December 2005, the use of vehicles with weight, load weight, or axle weight exceeding the specified limits, or vehicles which may cause damage to highways, is prohibited on special highways, national highways, and concession highways. It can be seen that this Notification of the Highway Director merely requires permission from the Highway Director, the National Highway Director, and the Concession Highway Director, or the designated person when having such vehicles driven on special highways, national highways and concession highways, under the necessary conditions and measures stipulated by the Highway Director. Later, the Licensing Facilitation Act 2015 was implemented with a requirement that the Department of Highways shall issue a public guideline so that the public are informed of the criteria of licensing and asking permission to use vehicles which may cause damage to special highways, rural highways, and concession highways. The details of such criteria are shown in the Public Guideline on Requesting Permission to Have Vehicles Driven on Special Highways, National Highways, and Concession Highways (Department of Highways, n.d.)

However, our research team is of an opinion that, as stipulated in the Highways Act 1992, the Highway Director's Notification, and the Public Guideline, sanctions are not provided for failure to comply with the conditions given upon the permission to have vehicles driven on special highways, national highways, and concession highway. As a result, the persons to whom permission is granted use vehicles carrying weight, load weight or axle weight exceeding the specified limits, or in a manner that can cause damage to highways. Also, no punishment is stipulated as to how much punishment shall be imposed for the amount of weight exceeding the specified limits. Consequently, a sense of fear is never created among the offenders and they are determined to carry as much weight as possible, thus incurring damage to the highways.

Insurance of trucks for the damage incurred by the OHTWC, resulting from vehicles to be weighed

Apart from the cases concerning vehicles which may cause damage to highways, there are also cases concerning vehicles which crash into public properties, incurring damage to weigh stations throughout the country. According to the Report on Car Crash Causing Damage to Public Properties Belonging to Weigh Stations throughout the Country, of which damage incurred on 14 stations are unclaimed to insurance companies. Examples are as follows in the Nongbua Station. An incident took place when a truck crashed into a dome camera, causing the camera's malfunction (21 May 2016 in Non-sung). A truck also hit the dome camera (29 October 2018). A truck crashed into a height barrier at the entrance of the parking spot (24 August 2018). Another truck hit a screening pole, resulting in the pole's collapse (27 May 2016). At Bangpa-in station, a truck crashed into a gate barrier at the station's exit, causing damage to the barrier (10 November 2016), etc. These aforesaid shows that, when the trucks go into weigh stations, sometimes they cause damage to public properties, incurring maintenance expenses. However, the fact that trucks have insurance sometimes causes a delay in collecting damages from insurance companies.

As a result, this part of unpaid damages needs to be further collected. In this regard, the research team views that the Office of Highways Vehicle Weight Control lacks a clear practical guideline to be applied in a case where vehicle users cause damage to public properties under the responsibility of the Office of Highways Vehicle Weight Control. Therefore, there shall be a uniform approach for the entire organization to deal with this matter. For example, a manual of operation shall be set forth, and personnel training shall be conducted to enhance knowledge and understanding of the methods of operation and the basic practical approach in cases where damage is caused at weigh stations.

Cases concerning Imposition of Sanctions to Ensure Vehicles' Weight Control

In cases concerning the imposition of sanctions to ensure vehicles' weight control, it is found that there are three issues hindering an enhanced efficiency of vehicles' weight control as follows:

1) Issues relating to the rate of punishment stipulated in case of violation of the Highway Director's Notification for carrying the weight exceeding the rate specified by laws: At present, the Highways Act 1992 stipulates different legal provisions imposing sanctions on persons who violate different provisions in Part 4 on Penal Provisions in section 69 to section 73/2. As for the offence of carrying a weight exceeding the limits proclaimed and specified, a penal provision has been enacted in section 73/2 to cover cases where a vehicle carries a weight exceeding the limits proclaimed and specified. According to section 73/2, it can be seen that a violation of the Highway Director's Notification pursuant to section 61 paragraph one carries an imprisonment sentence of a term not exceeding six months, or a fine not exceeding ten thousand Baht, or both. As a result, case studies can be categorized into a sentence of imprisonment and a sentence of fine.

With regard to sentences of imprisonment and fine, a study had previously been conducted to explore an approach to develop measures to control vehicle weight on highways. It was proposed that the rate of fines be increased and a progressive fines system be applied. Also, a case can be settled by the Committee on Case Settlement by Payment of Fine. The rationale behind this is that, the increased rate of fine will in turn affects entrepreneurs who use vehicles carrying weight exceeding the limits specified in the Notification in a way that they have to pay a considerable amount of fine. Therefore, it is not worth the income obtained additionally as a result of carrying the weight exceeding the limits specified in the Notification. On this part, the researcher, therefore, aims to conduct further study on the part that relates to sentences of imprisonment and fine. It is suggested that these sentences shall be consistent with the Department of Land Transportation's GPS technology already installed in every truck

(National News Public of Thailand, 2018). It is believed that imposition of heavy fines at a progressive rate can reduce the entrepreneurs' or truckers' motives to commit the crime.

2) Issues concerning cases without a specified rate of punishment, when permission is granted, and the terms relating to excessive loading over the legally specified limits have not been complied with, pursuant to the Highway Director's Notification: Pursuant to the Highway Director's Notification, Chapter 3 Other Requirements, Article 21 set forth the characteristics of vehicles of which the load weight is not in line with the Highway Director's Notification in Category 1 and Category 2. In such cases, a permission must be sought from the Highway Director. However, currently, there is no sanction imposed when the person to whom permission was granted by the Highway Director violates or fails to comply with the terms specified when such permission was granted. It is therefore necessary to conduct a study on various measures relating to violation or non-compliance of terms specified in the Highway Act 1992 so that measures or sanctions can be enacted and enforced against the persons violating or failing to comply with those terms. There are 13 sections regarded as provisions relating to permission on different matters pursuant to the Highways Act 1992 i.e. section 37, section 38, section 39, section 39/1, section 43, section 46, section 47, section 48, section 49, section 50, section 56, section 59, and section 60. These legal provisions set forth various actions and sanctions, which can be gathered according to the steps of actions as follows.

Table 1 Provisions relating to permission on different matters pursuant to the Highways Act 1992

Case	Provision
1) Cases concerning violations of provisions forbidding... unless permission is granted	1) There are sanctions imposed in cases of violations 2) Written notice demanding the offender to remove obstructions or make amendments 2.1) In cases of non-compliance, the Highway Director or the person designated by the Highway Director shall have the power to conduct removals or make amendments. Damages cannot be claimed, and the offender shall pay the expenses of such undertakings. 2.2) There are sanctions in cases of non-compliance with the order or the written notice.
2) Permission granted	The person to whom permission is granted must pay the highway fees at the rate specified in the Ministerial Regulation.
3) Permission denied, or permission granted with specified terms but those terms are violated or not complied with at a later stage.	1) Permission can be revoked 2) Permission shall be terminated. 3) An order is made, demanding the offender to make removals or demolitions within the duly specified period. 4) In cases of non-compliance, the Highway Director or the person designated by the Highway Director shall make removals or demolitions. Damages cannot be claimed, and the offender must pay the expenses for such undertakings.

3) Issues concerning a proposal for sanctions to be imposed in cases where vehicles fail to enter the weigh station as instructed by traffic signs and signals: Before vehicles carrying the weight enter the weigh stations, there are signs informing vehicle drivers that they are approaching the weigh station. As the vehicles are approaching the weigh station, traffic hand signals will be given by an officer to summon vehicles to the weigh station. Whether a non-compliance with such signals constitutes an offence punishable by laws is another issue to be studied. According

to the research, it is found that the Land Traffic Act 1979 and the Highways Act 1992 provide traffic signs and signals instructing vehicle drivers to the weigh stations. As for persons violating or failing to comply, they may be fined.

Apart from the Land Traffic Act 1979 which requires drivers to precisely comply with traffic signals and traffic signs, paragraph two of such provision also requires the Commissioner-General of the Royal Thai Police to publish traffic signals, traffic signs, as well as their meanings, together with samples of photographs in the Royal Gazette. According to the Land Traffic Act 1979 and the Royal Thai Police's Requirement on Traffic Signals, Traffic Signs as well as Their Meanings, Part 3 Introductory Signs prescribing traffic signs displaying information and services before approaching weigh stations, these signs are merely introductory signs. As a result, there is no sanction imposed in case of non-compliance with those signs.

In addition to the Land Traffic Act 1979 which is the main legislation with requirements regarding traffic signs and traffic signals, there is another piece of legislation specifying traffic signs and traffic signals i.e. the Highways Act 1992. This Act empowers the Minister of Transportation and the Minister of Interior to act with the power to enact the Ministerial Regulation with regard to the production, embroidery, and installation of traffic displays, traffic signs, traffic signals or other signals. It also requires that lines be drawn, messages be written, or any other signs be displayed on highways for purposes of traffic only.

As for traffic signals, on the one hand, the Highways Act 1992 empowers the Minister of Transportation and the Minister of Interior to enact the Ministerial Regulation. On the other hand, in the Land Traffic Act 1979, there is no legal provision relating to traffic signals particularly concerning signals introducing weigh stations to drivers. This results from both section 21 paragraph two which requires the Commissioner-General of the Royal Thai Police to publish traffic signals, traffic signs as well as their meanings, together with sample of photographs in the Royal Gazette, and section 28 which forbids anyone other than a traffic officer* or an officer from producing, installing, or rendering appearance of the traffic signal or traffic sign prescribed under section 21 by the Commissioner-General of the Royal Thai Police on the path. Furthermore, according to Article 4 of the Royal Thai Police's Requirement on Traffic Signals, Traffic Signs, as well as Their Meanings, hand and arm signals made by a competent official only refers to traffic signals given by a competent official in person. As such, it is the researcher's view that, in order to prescribe any traffic signal in the Ministerial Regulation, such traffic signal together with its sample must be published in the Notification pursuant to the Land Traffic Act 1979 first. Afterwards, sanctions and provisions requiring to pay fines via electronic means can then be prescribed in case of non-compliance with such traffic signals.

Permission is not required in cases of emergency trucks

In case of emergency, for instance, when an accident took place with a truck and it is, therefore, necessary to use another vehicle with excessive weight to lift the truck. In such cases, there is no legal provision relating to permission or related issues. The only related existing provisions include:

- 1) The Department of Highways' Notification on the Criteria on Requesting Permission to Have Vehicles Driven on Special Highways, National Highways, and Concession Highways;
- 2) Notification of the Special Highway Director, the National Highway Director, and the Concession Highway Director;
- 3) The Highways Act 1992, as amended by the Highways Act (Issue no.2) 2006, resulting in Article 21 of the Highway Director's Notification. As a consequence, additional legal provisions should be enacted as exceptions in case of absolute emergency so that necessary actions can be taken immediately. After such an emergency situation has passed, a permission must be sought from the Director of Special Highways, National Highways, and Concession

Highways, or the designated person, in accordance with the necessary terms and measures prescribed by the Highway Director. The Disaster Prevention and Mitigation Act 2007 is a legislation stemming from the government reform in accordance with the Reorganization of Ministry, Sub-ministry, and Department Act 2002. This in turn led to the establishment of the Disaster Prevention and Mitigation Department as a government agency under the supervision of the Ministry of Interior.

The Department is mainly tasked with the prevention, mitigation, and recovery of disasters and public accidents. As such, undertakings on disasters and public accidents previously conducted by two agencies, including the Civil Defense Division in the Department of Local Administration under the Ministry of Interior, and the National Safety Council in the Office of Permanent Secretary for the Prime Minister under the Office of the Prime Minister, have now been integrated and under the responsibility of the same agency. Additionally, the law on fire prevention and defense is the substantive legislation with details concerning disaster prevention and mitigation on the aspect of fire, as well as the responsible agencies. This is so that undertakings pursuant to such legislation can be conducted by the same agency for the efficiency and standardization of the tasks as well as the uniformity of administration and management of disaster prevention and mitigation. It is therefore deemed appropriate to incorporate the law on civil defense and the law on fire prevention and defense into one piece of legislation (Disaster Prevention and Mitigation Act, 2007).

As for the approach to how the agency can undertake activities to support missions on disaster prevention and mitigation pursuant to the National Disaster Prevention and Mitigation 2007 (Office of Transport and Traffic Policy and Planning, 2017), the Department of Highways shall undertake activities as follows:

- 1) To create the agency's operational plans on disaster prevention and mitigation that cover all areas and all disasters, by prescribing steps and methods of operation from disaster risk reduction management in crisis and recovery plans;
- 2) To create a database of vehicles, equipment, tools, instruments used in construction and maintenance of roads and communication devices, in categories of usual operations, rescue and disaster mitigation operations, frequent operations, and area-based operations;
- 3) To provide support to vehicles, officers attached to vehicles, tools, instruments used in construction, road maintenance, transportation, rescue, and mitigation of disasters, and other areas, to prepare fuel, as well as to coordinate on seeking assistance from networks in the private sector when requested;
- 4) To prepare and provide spare routes or temporary routes, and mend or alter facilities, especially damaged roads or bridges, to enable transportation on alternate routes until the transportation is safe, connected, and coordinated;
- 5) To set forth steps, a chain of commands for granting permission to facilitate assistance and support among agencies, as well as to designate points of contact, both in central units and in areas of disasters;
- 6) To create the agency's operating manual to facilitate and support undertakings conducted by the main agencies responsible for disaster prevention and mitigation, and to rehearse such operations in due course.

According to the research, it is found that the Highways Act 1992 has set forth a sanction of a 10,000-Baht fine or 6-month imprisonment for vehicles carrying the weight, load weight, or axle weight exceeding the limits specified by laws. This sentence is regarded as mild punishment, when taken in comparison to the current economic and social conditions. Also, such punishment cannot effectively deter crimes as, with this provision of law, employers or real masterminds of excessive loading cannot be brought to justice. Instead, employees and truck drivers are prosecuted at their expense. As a result, the problem of excessive loading of trucks is neither solved nor lessened. On top of that, truck owners somehow found a way to

prevent their trucks carrying an excessive load from being confiscated. It is, therefore, necessary to amend the provisions concerning the excessive loading of trucks over the limits specified by laws. With regard to violations and sanctions, it is imperative that section 61 and section 73/2 of the Highways Act 1992 be revised and amended. Moreover, the Highway Director's Notification shall be added so that measures on case settlement by paying a fine can be applied to those who violate the laws against excessive loading over the legal limits. Also, effective measures to ensure that trucks carry appropriate weight can be explored with collaboration from relevant agencies in the Ministry of Transportation as well as other agencies whose missions relate to highways. This is so that those measures can be adopted to solve the problem of excessive loading of trucks over the legal limits.

Conclusion

Undertakings conducted by the Office of Highways Vehicle Weight Control, Department of Highways to address the five case study issues will ultimately determine how effective the solutions to the problem of excessive loading over the legal limits and the measures controlling vehicles' weight can be. These case study issues are as follows;

- 1) the problem arises as the Highways Act 1992 has not been amended.
- 2) cases concerning vehicles outside the scope of the Categories 1 and 2 of the Notification issued by the Director of Special Highways, the Director of National Highways, and the Director of Concession Highways, or other vehicles in Category 3.
- 3) insurance of trucks for the damage incurred on the OHTWC, resulting from vehicles to be weighed.
- 4) cases concerning Imposition of Sanctions to Ensure Vehicles' Weight Control.
- 5) permission is not required in cases of emergency trucks.

Moreover, a study shall also be conducted to learn about an internal collaboration among different agencies in the same Ministry, and inter-agency collaboration. Furthermore, many types of vehicles are involved on this matter, including cars, trucks, cranes, semi-trailers, and this, again, concerns various agencies. For example, the Department of Land Transport, the Department of Highways, the Department of Rural Roads, the Royal Thai Police.

Accordingly, the study is conducted on the laws relating to excessive loading over the legal limits and the appropriate measures controlling vehicles' weight as adopted by the Office of the Office of Highways Vehicle Weight Control. The emphasis of the study is placed on the revision and amendment of legislation to ensure effective law enforcement. In other words, the Highways Act 1992 contains sanctions unsuitable for the current economic and social conditions of Thailand.

It is proposed by our research team that the approach on how to improve legislation on the management of the Office of Highways Vehicle Weight Control, in line with its objectives, should be adopted as a recommendation on the approach to appropriately provide cost-effective solutions for the Office of Highways Vehicle Weight Control's management so that the agency can put forward an active policy in line with the country's long-term strategies. Also, it should be adopted approach on the solution resulting from consultation, as the Consulting Committee, on the Office of Highways Vehicle Weight Control's management.

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