Fact finding about school zone: a case study in regional cities of Thailand

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Abstract

A survey of school zones in regional Thailand has discovered several unacceptable facts related to safety. School zones in regional cities of Thailand have been neglected for safety treatment: no warning signs, lack of clear identification, poor traffic management, lack of traffic discipline, etc. The safe gap is also insufficient for a child to cross safely without authorized personnel to facilitate the crossing process. The speed profile along a school route was found to be a little low in front of the school due to chaotic conditions during rush hour, but the average speed is still higher than the speed limit. In addition, driver discipline is not acceptable due to mismanagement of law enforcement. Moreover, sidewalk blockage by street vendors, fixed objects, etc. creates an unpleasant condition for pedestrians, forcing them to use the road surface as a walking path. Without good management, these conditions lead to hazardous conditions to pedestrians. In addition, chaotic conditions create a bad example, and thus cause bad travel behaviour and misunderstanding of traffic discipline in the younger generation. Providing proper environmental adaptation, road marking, signs, and training on our target schools prove that to get a safer environment in school areas we need to invest in some way.

Keywords: safety gap, school zone, traffic discipline, traffic calming.

1 Introduction

Recently, the Thailand Global Road Safety Partnership (GRSP) conducted reviews of school zones in Thailand, with the results showing that many urgent issues need to be addressed. A School zone is an area where accidents and near miss incidents are one of the problems facing our community. The situation is
worst during morning and evening peak times due to the surge of schoolchildren in and out of the school, disobedience of traffic regulations such as double parking and parking in forbidden zones, and indiscipline in crosswalk use by schoolchildren. From the result of the study, drivers seem to pay no attention to highly sensitive safety areas such as school zones. Most drivers did not realize there is a “school zone” at all because they have never been educated or informed about the importance of the school zone. In fact, from the survey, there are no warning signs such as “School Zone” or “Crosswalk” in the vicinity of schools. Without any solution, schoolchildren have to live in an unsafe environment, and the community shall not allow this condition to continue.

Routine maintenance including reinstallation of traffic signs, devices and markings near school areas is an important activity, keeping the effectiveness of the school zone up to the desired level. Provision and inspection of all safety devices in and around school zones shall be mandatory activities for all responding agencies. Moreover, education programs for road users and schoolchildren, explaining concepts such as safe speed, safer routes to school, traffic safety, etc. shall be reinforced.

2 Purposes

The major purpose of this study is to investigate the safety of school zones. Details of the key study areas for school zone safety in relation to this study are summarized as follow:

- To investigate the safety situation of schools in regional cities of Thailand
- To minimize the possibility of accidents and near miss incidents in the vicinity of schools
- To reinforce traffic discipline for road users, parents, and schoolchildren
- To communicate and warn road users of school zones using proper measures
- To build better road environments for both road users and pedestrians

3 Methodology

An electronic speed gun, a magnetic imaging device, is mainly used in collecting data such as gap and speed profile. Survey crews conduct sidewalk studies to evaluate walking conditions. The processes conducted in this study can be summarized as follows;

- Survey for existing conditions around the school: speed, number of pedestrian using and not using the crosswalk in the vicinity of school, pedestrian walkway usage, and safe crossing gap
- Propose remedial measures according to the survey results
- Conduct after study to evaluate proposed measures and use as feedbacks to the study
4 Scope of the study

The target school was located in the city limit, and on a 4-lane collector road with 3.5 meters width of walkway as shown in figure 1. There are 1,320 students range from kindergarten to grade 6.

![Figure 1: Location of the study area.](image)

5 Fact-finding

The study results reveal several facts about safety conditions and suggest possible safety solutions: education, enforcement and engineering. For the educational solution, stakeholders are road users, parents and schoolchildren. The survey results show that road users pay the least attention to the school zone, based on the chaotic conditions in front of the school. Many road users have never understood or been informed properly the meaning of school zone and its’ importance.

Police officers and school administrators are grouped into the enforcement solution. Speed seems to be a little high for a school zone since enforcement on this category is neglected – according to the police record [1]; no drivers have been issuing a speeding ticket in the school area. Figure 2 shows the speed profile that is a little lower when a police officer is present at the crosswalk compared to when an officer is not present. Nevertheless, the profile is considered higher than an acceptable level. Most parents lack of traffic discipline both when dropping off and picking up their children.
The engineering solution is the responsibility of the municipality. Cooperation from the school is necessary in order to encourage and enforce both parents and schoolchildren to keep the school zone safe; presently this does not exist in a systematic format. In addition, a long line of traffic is a common scene in front of the school, and this is due to poor traffic management and miscommunication between the school and parents. Schoolchildren are not
released from school on time after school hours, which causes this congestion problem. Illegal movement is also common, even on crosswalks as seen in figure 3. Pedestrians found that traffic movement on the sidewalk is not easy due to blockage from street vendors, with the problem emerging from lacking of cooperation from vendors and the school, and loose enforcement. Eventually pedestrians are forced to walk on the road surface.

Relating to the engineering solution, there is currently no proper way to communicate between road users and the school zone, such as warning signs, accurate and proper marking and traffic management. In addition, the application of traffic calming; another solution to enhance safety of school zone, has never been employed.

6 Proposed solutions

According to the study, the issue of school zones and their necessity were brought up on the table during a meeting with all responding agencies. Excessive vehicle speed and traffic volume in school crossing areas and pick up or drop off area are common problems in an area of school zone through out Thailand. Based on brainstorming involving all agencies; police officers, school administrators, road users, municipality representatives, etc., possible solutions for each category have been suggested. Details and reasons for each proposed measure are listed in the following section.

6.1 Education

Traffic safety programs shall be arranged in a systematic fashion, and be a mandatory part of the school curriculum for all students. This will have two-fold benefits; first schoolchildren will get the benefit directly from the knowledge gained from the program, and second, these children will later convey the knowledge regarding traffic regulation gained from school to their parents. The most important feature of the safety program is that all proposed educational programs for both schoolchildren and road users must be consistent and successive. A school zone campaign needs to be continuously launched via any media.

6.2 Enforcement

Besides an officer present at crosswalks, enforcement can be introduced in many forms, such as issuing tickets, monitoring speed, controlling car parking, and managing sidewalks. Without a suitable level of enforcement, road users seem to ignore their responsibility for caring for other stakeholders’ safety, especially schoolchildren since these children are not adults. Figure 4 helps to confirm the necessity of law enforcement. Without any officer present at the crosswalk, there is no chance for schoolchildren to cross safely. Using equation from the study of Currin [2] as shown in equation no. 1, safety gap was determined and finds that there is no such a safety gap available for schoolchildren to safely cross the street.
Figure 4: The relationship between frequency and time headway.

Min. Safe Gap = \frac{\text{Street Width (ft)}}{\text{Walking Rate (ft/s)}} + 2(N-1) + \text{Perception/Reaction Time} \quad (1)

Street width (ft) = 44 ft.
N = Number of Rows in 85th Percentile (5 students per Row)
Perception/Reaction Time = 3 sec.
Walking Rate (Children) = 3.5 ft/sec.
Safe gap needed for schoolchildren to safely cross the street equals to 16 sec during 3.30 to 5.00 pm, and 18 sec during 7.00 to 8.00 am. Therefore, assistance from adults or police officers is necessary.

To release police officers burden, technology on law enforcement, such as speed cameras can be employed, and these instruments are already available in Thailand. Parking tickets need to be issued for those violating parking bans on a daily basis, especially those next to a crosswalk. A sidewalk shall be reinstalled with an effective width of at least 1.5 meters to keep pedestrian flow coherent with a desired level of service.

6.3 Engineering

Responding agencies such as the municipality seem to spend little effort on school zones. The annual budget on the school zone is very small compare to investment cost on road construction. School zones need to be set up properly and the methods of communicating with road users about the zone need to be
clear and understandable. Warning signs such as “school zone”, “pedestrian crossing” and regulatory signs like speed limits need to be properly installed. Traffic calming objects, such as pedestrian refuges, reduced roadway width resulting in vehicle speed limit in front of the sensitive or core areas is important. According to Ewing [3], environmental adaptation is introduced in this study since the road next to the target school is a collector road.

7 Conclusion

According to police record, there are few accidents in the vicinity of the school, however the occurrence of a number of near miss incidents cannot be denied or ignored. Beside the selected school, most of the schools in Udon Thani province have not reached a suitable safety requirement. The requirement ranged from basic needs like warning signs, to time consuming tasks like educational programs. All proposed activities are necessary to build a safe environment and enhance safety in the school zone. Currently, it is well accepted that traffic discipline need to be provided to all ages of stakeholders. Pedestrian rights are also important and needed to be protected. Learning should be a two way communication between children and parent.

Unfortunately the final stage of this study has not been reached yet, but all responding agencies accepted and picked up the idea of road safety. Activities proposed in the study are being monitored for their effectiveness. These activities intend to enhance safety and cause a reduction of traffic accidents in school zones. According to our study, traffic signs and markings have greater effect on safety than just their appearance. From the preliminary review of our study, speed profile has been shifted in a satisfactory direction. After the study is commenced it may take time before final results can be released to all relevant agencies.

Even though the complete study has not been reached, at this stage it shows a positive sign to enhancement of safety in school zones.

References