REPORT OF RESEARCH RESULTS

(a) Title: A Study of Footbridge Utilization Behavior in Nakhon Ratchasima

(b) Primary Researcher: Miss. Onanong Sangphong
Transportation Engineering, Center for Applied Transportation and Logistics Technology
Suranaree University of Technology

Co-researcher(s): Dr. SIRADOL SIRIDHARA
Lecturer, School of Transportation Engineering,
Suranaree University of Technology

(c) Summary
Footbridges are a type of pedestrian facility which guarantees complete safety for road crossing. With a concept of “grade separation”, vehicular traffic is separated from pedestrians. However, unlike normal traffic interchanges where a car would go up a flyover or other types of grade-separate interchange and cross a conflicting traffic stream effortlessly, pedestrians tend to evaluate effort of walking to the footbridge
and climbing up high stairs against convenience of jaywalking on the street surface while risking accident and fines.

Pedestrian behaviors always play an important role in road safety. They evaluate the traffic conditions and street environment and decision to react on situations based upon personal benefits. The 2010 record shows 1,737 pedestrian accidents in Thailand, most of which were resulted from their decisions and behaviors. A study of footbridge crossing behavior aims to determine factors affecting decision whether to use the footbridge. Traffic speeds and flows, number of traffic lanes, the height and location of footbridges and other influential factors will be taken into account. Although the study area will be limited to Nakhon Ratchasima Municipal Area and its vicinity, the result is expected to be transferable to most medium-sized cities in Thailand. The results will be used to design facilities and set measures to respond to the needs of pedestrians from all sexes and age groups.

This research are suppose to studies about pedestrian crossing walk usage behavior for people in Nakonrachasrima province and also request for factors that people decide to use type of crossing. By Logistic Regression Analysis method, the
data come from interview the pedestrian and analysis by SPSS program.

(d) **Aim of Research**:

1. To study the factors influencing the decision to use or not to use footbridges.
2. To develop footbridge utilization behavior model.
3. To determine general locations and other characteristics of footbridges that would be attractive to pedestrians.

(e) **Method of Research & Progression**:

The data used in the analysis for this study. The Primary Data is data collected from a survey of the Field observation and interview in six study locations. It have sample size are workday 3,083 persons and weekend 3,168 persons.

**Table 1: Topography of the Footbridge**

<table>
<thead>
<tr>
<th>Location</th>
<th>Traffic Volume</th>
<th>city</th>
<th>No of lanes</th>
<th>Roof</th>
<th>Island</th>
<th>Bus stop</th>
<th>Distance from the junction</th>
<th>transparent bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nakhon Ratchasima Rajabhat University</td>
<td>Low</td>
<td>urban</td>
<td>6</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Pak Thong Chai</td>
<td>Low</td>
<td>urban</td>
<td>8</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>School Name</td>
<td>Type of School</td>
<td>Subtype</td>
<td>Level</td>
<td>Reactors</td>
<td>Ponds</td>
<td>September</td>
<td>October</td>
<td>November</td>
</tr>
<tr>
<td>-----------------------------------</td>
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<td>-----------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>Marie Vithaya School /Saint Mary's College</td>
<td>High urban</td>
<td>4</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Suranari Witthaya School</td>
<td>High urban</td>
<td>6</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Bunluawittayanusorn School</td>
<td>Low Suburban</td>
<td>6</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>JOHO</td>
<td>High Suburban</td>
<td>6</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>80 Meter</td>
<td>Yes</td>
</tr>
</tbody>
</table>
A Data Collection uses a Revealed Preference Questionnaire Survey to interview face to face for pedestrian this study a sample size 435 person for suburban and 705 person for Urban and topic to interview for a Socioeconomic characteristics such as sex and age. This study analysis base on Logistic Regression.

\[
\text{prob(event)} = \frac{e^{V_{ln}}}{1+e^{V_{ln}}}
\]

Where \( V_{ln} = \beta_0 + \beta_1 X_{ln1} + \beta_2 X_{ln2} \ldots + \beta_n X_{lnk} \)

\( \beta_0 \) and \( \beta_1 \) are parameters estimated from observed data

\( X_s \) is independent variables

\( e \) is the base of the natural logarithm, approximately 2.718

(f) Results of Research:

Logistic Regression Analysis Model

- Urban
  
  \( V_{ln} = 3.243 - 0.688(\text{dis}_\text{bus}) + 0.300(\text{N}_\text{friend}) \quad R^2 = 0.763 \)

- Suburban
\[ V_{in} = 0.654 - 0.423 \text{(dis\_bus)} + 0.209 \text{(N\_friend)} + 1.787 \text{(law)} + 1.483 \text{(accident)} \quad R^2 = 0.760 \]

Where:

- \text{dis\_bus} = \text{Distance from bus stop to footbridge}
- \text{N\_friend} = \text{Number of friend to group pedestrians}
- \text{Law} = \text{Know law about pedestrian}

**Recommended Measures to Encourage Footbridge Use:**

- Public relation on pedestrian traffic laws would help improve ratio of footbridge users by 4.32% Ideal locations for footbridges are near bus stops.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Urban</th>
<th>Suburban</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distance (bus stop to footbridge)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Meter</td>
<td>6.5 % (+)</td>
<td>7.22 % (+)</td>
</tr>
<tr>
<td>2 Meter</td>
<td>5.09 % (+)</td>
<td>4.41 % (+)</td>
</tr>
<tr>
<td><strong>Group pedestrians</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 people</td>
<td>0.20 % (+)</td>
<td>0.10 % (+)</td>
</tr>
</tbody>
</table>
Findings

1. Footbridges near schools are more utilized.
2. The existence of the island reduces percentage of footbridge use.
3. In the urban & suburban area, group pedestrians tend to use footbridge.

(g) Future Areas to Take Note of, and Going Forward :

I. Effective design of footbridge should consider user behavior and preferences.

II. Locations should be carefully determined to maximize the benefit of the footbridge.

III. Pedestrian safety awareness should be fostered to children and students.

(h) Means of Official Announcement of Research Results :

We will submit our research to gather comments in reputable transportation Journal. Now we already submitted the research abstract for approval and are waiting to submit the full
paper in SWU Engineering Journal. We expect the publication