

Project for the Reduction of Greenhouse Gases through Traffic Flow Improvement at the Bang Na Area in Thailand

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(1) Objective of the Project

The objective of the project is, in cooperation with all project participants, to improve environment by alleviating traffic congestion in a specific road intersection in Bangkok area and thereby reducing the greenhouse gas emissions.

(2) Study Area

The study area comprises four intersections (Figure 1) on the major trunk road, Sukhumvit Road, which runs from the center of Bangkok to Samutprakan. The Bang Na intersection is subject to especially heavy traffic and has a complicated shape because of the nearby on and off ramps to the Port Expressway. This intersection is also serving as a transfer point for inner city bus lines and bus lines connecting the city with other destinations in the suburbs.

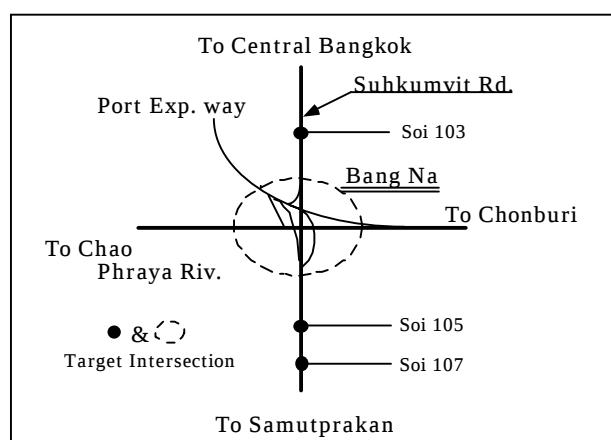
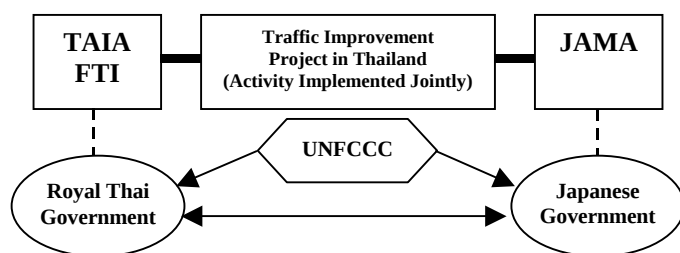


Figure 1 Intersection in the study area

(3) Overall Structure of Project

As shown in Figure 2, this Project is implemented by Japan and the Kingdom of Thailand according to the Activities



UNFCCC: The United Nations Framework Convention on Climate Change

Figure 2 Overall project structure

Implemented Jointly (AIJ) plan. As the private sector representative from the Japanese side Japan Automobile Manufacturers Association (JAMA) played an important role. Also, the Thai Automotive Industry Association (TAIA) and the Federation of Thai Industries (FTI) were the private sector from the Thai side.

(4) Traffic Conditions in the Study Area

The important characteristics of the traffic conditions in the study area before the improvement are listed below:

- Variety of traffic flow broken down by direction (Bang Na intersection);
- Fluctuations in traffic flow by the time of day; and,
- Breakdown by type of vehicle (24% of all vehicles are motor bicycles and about 70% of all large vehicles (which comprised 13% of total vehicles) are buses (8% of total vehicles).

As a result, the backed-up traffic at its greatest length reached almost as far back as the preceding intersection and the traffic reaches back about halfway to the preceding intersection on the average. As for vehicle speed during the peak hours, it was under 20 km/h.

(5) Traffic Issues and Problems in the Study Area

Traffic issues indicated by the results of on-the-spot traffic survey and field research and problems which require solutions were categorized into the following:

- Network problems related to the traffic system,
- Problems related to traffic signal control, and
- Other traffic management and control.

With regard to the traffic signal control, there were some variations in the length of the cycles within the different periods and signaling split also varied. The length of a cycle was 400 seconds (about 7 minutes), which is remarkably long.

Because the cycle length and split were irregular and the

cycle is so long, a stable flow of traffic could not be maintained. The biggest problem was that traffic back-ups and major congestion in the study area were caused by the long waiting time for the traffic light.

(6) Project Proposal

JAMA sent a study team from Japan in 1997 to study how the traffic congestion problem in Bangkok can be improved, and several traffic improvement plans to be implemented in the Bang Na Intersection area were proposed and evaluated. After meetings/discussions with many relevant authorities, the 'traffic signal system improvement,' having the largest improvement effect of all, was selected as the traffic improvement project of the study area. JAMA/TAIA submitted this proposal to the Sub-committee of UNFCCC for approval as AIJ.

(7) Outline of the Traffic Signal Improvement Plan

The concept of the traffic signal improvement is listed as below and partly depicted in Figure 3.

- Installation of new traffic signals,
- Shortening the cycle length,
- Counterclockwise signal phase,
- Progressively coordinated signal control,
- Implementation of Traffic-actuated signal control, and
- Compatibility with ATC system.

Based on the above signal improvement concept, the theoretical formation of an optimal signal control system using the latest detailed traffic information was carried out.

(8) Implementation of the Improved Signal System

The construction work started at the beginning of December 1999 and finished at the end of March 2000, and JAMA/TAIA handed over all of the equipment to BMA on

March 27, 2000. However, the completed improved signal control system needed to be adjusted so that it is appropriate for the actual traffic flow on-site. The adjustment has to be carried out through close cooperation with the Royal Thai Police Department (RTPD) which carries out daily management of traffic on-site and monitors the operation of the new system.

In order to execute the above process successfully, feedback from the RTPD is essential. Also, RTPD is the one who will switch over from the newly proposed automatic control to the previous manual control, and as a communication channel to properly inform them of the concept behind this signal control system and its details, exchange information about signal adjustment using the above process and to transfer technology, technical workshops catered mainly for the RTPD were held a total of five times in 2000.

(9) Project Results

In order to discover the degree of improvement in the traffic flow as a result of implementing the improved signal system, a traffic survey was carried out after the project, focusing mainly on traffic volume and travel speed.

The average travel speed in the Project area has shown an improvement of +6.7km/h. Although this is slightly less than the travel speed improvement estimated through the dynamic traffic simulation (+7.5km/h) carried out before the project implementation, it can be said that a fairly close result has been obtained. As for the results of the reduction in average travel time calculated by route, a maximum of 6 minute reduction has been achieved.

The reduction in CO₂ emission as a result of the optimal signal control system was calculated to be about

2,390kgC/day, and in terms of annual reduction in CO₂ emission it is roughly 872tC/year (both are carbon conversion). The CO₂ emission reduction ratio compared to before Project implementation was around 16.1%. It can be said that the objective of this Project, which was to reduce greenhouse gas by improving the traffic flow at the intersections, has been accomplished.

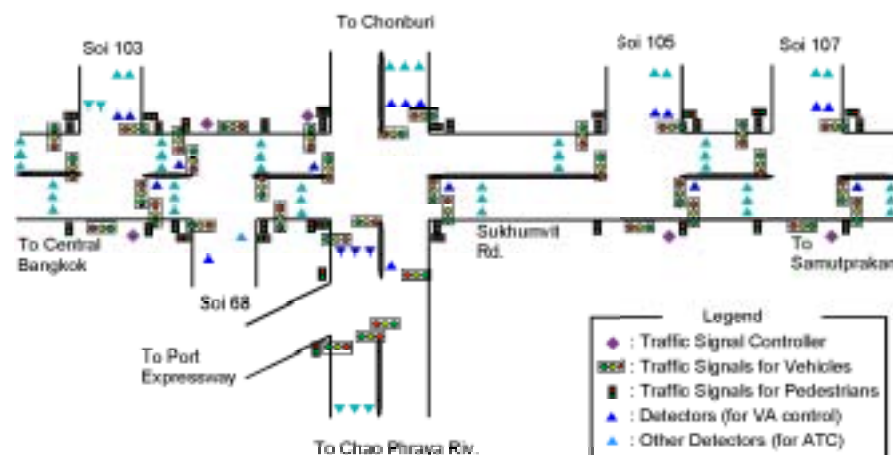


Figure 3 Outline of the improved traffic system at Bang Na intersections