

TIME/COST-DISTANCE METHODOLOGY

A Quick Guide on the Use with the Satellite Positioning System (SPS)

SPS is popular and low cost in international transport throughout the world. Nowadays, SPS is widely used by air and maritime transport. Installation of SPS in road vehicles has become mandatory in some countries in the region. For example, the Government of China has required all long-distance passenger transport and carriage of dangerous goods to install SPS, and recommended other road transport to install SPS. In Viet Nam, the Government has also required buses and trucks to install SPS. On the other side, many transport operators also install SPS for their road vehicles.

With the help of SPS, the government authorities relating to transport may easily manage traffic, increase transport security and pinpoint any traffic accident. Transport operators may provide more efficient and effective transport services, reduce empty runs and secure their operations.

The use of SPS in road transport is generally associated with computer information system to keep records of all operations, including time and routes. This provides precise trip data to make route analysis with the Time/Cost-Distance Methodology. Presently, some organizations or institutions rely on information provided freight forwarders through their best estimates in operations. It is normally costly and difficult to collect data for the application of the Time/Cost-Distance Methodology. It is advantageous to collect data with SPS and associated information system.

The drawback of this approach is difficulty in processing enormous amount of data. As the system records all details of vehicle trips by one operator or in one country, the trip data may be million or millions of vehicle trips. Facing such amount of data, how to use the data for analysis becomes a challenge for the application of the Time/Cost-Distance Methodology.

Another difficulty in the application of the Time/Cost-Distance Methodology with SPS and associated information system is determination of routes as road vehicles move around and may not always follow a particular route.

In order to overcome the afore-mentioned difficulties, a well structured approach may be followed to apply the Time/Cost-Distance Methodology with the following steps:

a. Selection of routes. Routes should be selected one by one. Starting and ending places need to be fixed for each route. If a corridor including several routes is to be analyzed, routes may be analyzed separately and averaged for the corridor. If a route consists of separated expressway and normal road, it may be broken into two sub-routes.

b. Selection of route distance. Travel distance of a particular vehicle may slightly vary from others along a selected route. It is desirable to determine the distance of a route as marked on an authoritative road map or fixed in SPS monitoring system.

c. Selection of vehicle trips. Only the vehicle trips for transport along a selected route between starting and ending places may be selected for analysis. Other trips using part or parts of the selected route or covering the selected route as a segment of entire carriage may be screened out.

d. General analysis of efficiency of a route. For such analysis, all the qualified vehicle trips as described in Step c should be included in theory. However, if a system has no function to make automatic summary or average of times spent by various vehicle trips, it is a time consuming work to manually note thousands of records and input into a computer for analysis. In such case, statistical methods, such as sampling technique, may be used to take a number of samples and make analysis. The samples selected for analysis may include the trips by different types of vehicles and for different types of goods.

e. Analysis on efficiency of a particular group of vehicles. Apart from general analysis of route, a particular group of vehicles may be selected to make more precise analysis on travel time of this group of vehicles in connection with distance. Together

with Steps a to c, limited number of vehicle trips may normally left for analysis. If number of vehicle trips is enormous, sampling technique needs to be used.

f. Analysis on efficiency of transport of a particular type of goods. In addition to the analysis of a particular group of vehicles, analysis on a particular type of goods is complementary. The general analysis, analysis of groups of vehicles and analysis of types of goods with the Time/Cost-Distance Methodology may provide a better picture for decision-makers in an authority, manager in a company and researchers to understand problems in transport and find possible solutions. In order to make analysis on various types of goods, purpose for the analysis should be clarified first. If analysis is for overall transport planning and management, goods may be classified with conventional transport classification, such as containers, dry bulk and liquid bulk. If trip records are still large for a particular type of goods, sampling technique may be used as recommended in Step e.

g. Analysis on impact of seasonal changes on efficiency of transport. Travel time of vehicles in a specified time period may be selected to undertake this task. In such case, large number of vehicle trips will be found for analysis. Sampling technique may be used to make analysis. The samples selected for analysis may include the trips by different types of vehicles and for different types of goods.

It is desirable for a carrier or an authority, which are using SPS monitoring system, to add a function in the monitoring system on analysis of efficiency of operations on key routes and key goods. This may help the carrier and authority to identify particular problems along various routes and in carriage of various goods, and improve operational efficiency accordingly.

In some countries, SPS monitoring system is also applied for maritime container transport. If the application of the Time/Cost-Distance Methodology is for transport of container, it is good to make full analysis of container transport by land and sea. General principles mentioned above may be applied for analysis of entire transport route.