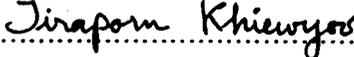


THESIS TITLE : Solid Waste Collection and Transportation System of Khon Kaen
City Municipality

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ABSTRACT

The objectives of this research study was to investigate the current status of solid waste collection and transportation system and to ranking the measurement of collection and transportation development of sub-collection zones in Khon Kaen city municipality. The study was conducted from October 1997 to January 1998 by collecting data and all factors involved. Time and motion of the operation was also incorporated in the study . NINE variances were created from the study, then using taxonomy method to analyse variances for ranking the collection and transportation development.

The research result showed that in 1998, Khon Kaen city municipality area was 46 square kilometers with the citizen of 211,447. The quantity of solid waste was 188.39 tons per day, solid waste collected was about 147.32 tons per day or 78.2 percents of total quantity and the average solid waste generation rate was 0.89 kilogram per person per day. Collection work was the responsibility of Cleansing Unit, Environmental Health Department, which consists of 246 workers. The proportion of workers to total citizen was 1 to 860. The solid waste collection area was divided into 4 major-collection zones with 21 sub-collection zones.

There were twenty-three collection trucks including five 10 m³ and ten 12 m³ non-compaction side loader trucks, two 10 m³ dumping trucks, five 3 m³ pickup trucks and one 30 m³ trailer truck. The collection system was stationary hauled container system (SCS) with the major

part of solid waste containers were 200 litres metal drum (1,179 drums or 27.37% of total container). The collection method was curbside collection (92 % of collection point), which was appropriated for characteristic of collection areas.

The result of time and motion study of sixteen collection trucks which transported solid waste to disposal site in two trip per day per truck found that average time used to pickup and unload container for 200 litres metal drum was 47.36 seconds per container, which was the most time used comparing to other types of container and 240 litres plastic container was 42.66 seconds per container. Total operation distance of a truck in one trip was about 55.66 kilometers; hauling distance was about 21.46 kilometers (38.56 %), beginning of next collection route distance or return to dispatch station-end of route distance was about 20.90 kilometers (37.55 %) and collection distance was about 8.80 kilometers (15.80 %). Total operation time was about 241.04 minutes per trip or 8 hours per day; the most time consuming was collection time (50.51 %), off-route time was 19.76 percents and transportation time was 13.38 percents.

In 1997, Khon Kaen city municipality had earned solid waste collection and transportation fee only about 90.29 baths per ton of solid waste, but the total cost of collection and transportation system was about 398.14 baths per ton of solid waste.

The ranking of 16 sub-collection zones' collection and transportation development with 9 variances by using taxonomy method indicated that the best sub-collection zone in management of solid waste collection and transportation was S.41 and the worst was S.26 with the measurement of collection and transportation development (d) equal 0.4024 and 0.9038, respectively.