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WASTE MANAGEMENT – REVERSE LOGISTICS THAILAND PREPARING FOR ASEAN

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Graphical Abstract

Abstract

With the Advent of ASEAN municipal solid waste (MSW) is estimated to increase 2-4% per year benchmarking waste management practices becomes of interest for the partner countries. This study surveyed logistics professionals from various parts of Thailand to obtain their feedback regarding waste management practices in their specific geographic location in terms of collection, transportation and disposal of the household and commercial waste.Refuse is collected in containers of various shapes and sizes ranging from baskets to metal and plastic garbage tons and dumpsters. The garbage truck size and type varies throughout Thailand but is more or less consistent within a municipality, rear loading with a crew of four including driver appears to be the standard, with sorting of garbage taking place at the truck at time of collection.

Keywords: Waste management, Municipal Solid Waste, recycling, reverse logistics

1.0 INTRODUCTION

Waste Management in the traditional sense focused on the collection of waste and the disposal of waste which may also include treatment of waste. The collection of waste is a subset of the logistics industry. It is supply chain management in reverse. The logistics aspect includes what to collect and when. There are various waste categories from household to industrial waste. From non-toxic to toxic waste and from solid to liquid waste. Municipal Solid Waste (MSW) includes garbage, refuse, rubbish, debris, litter and other discarded materials resulting from residential, commercial and institutional activities. MSW need to be collected. The collection can be fairly easy from picking up garbage tons or dumpsters. The pick-up nowadays occurs by garbage trucks. The truck routes need to be planned and scheduled according to volume and demand. The logistics effort varies from so called milk runs to special pickups. From trucks being manually loaded by crews of garbage men to semiautomatic trucks which have pneumatic arms loading the garbage cans [1]. Front loading garbage trucks which pick up the dumpsters and dump them overhead as it is common practice in the USA, where front loader dominate the market. While in Europe garbage trucks are normally rear loaders and occasion side loaders, where the driver sits on the left-hand curbside side of the truck and loads the truck without leaving the truck remotely [2]. Waste management in the western world has come a long way from its early days in 1751 when Corbyn Morris proposed that the "cleaning of the city should be under the uniform public management, and all the filth be conveyed by the Thames to proper distance in the country" [3]. Following the industrial revolution

European cities institutionalized waste handling and garbage collection, under the authority of the municipality. Shortly after that the US followed the European model and it did not take long until the colonial powers also institutionalized waste management in the colonies [4]. Thailand was somewhat an exception as it was never colonized and therefore the waste management was more or less driven by necessity, reaching out from Bangkok into the suburbs and beyond. In Table 1 we summarize the findings of the research which focused on Municipal Solid Waste (MSW) Collection throughout Thailand and the types of garbage cans used along with the types of trucks and following disposal methods.

Table 1 Municipal Solid Waste (MSW) Collection Thailand[a]

Entry	Category	Most Common Urban	Exception Urban	Special Applications		Standard Deviation SD
				Rural Areas	Special Applications	
1	Truck Type	Rear Loader	Side Loader	Dump Truck	Front Loader	40.32%
2	Truck Type	70%	15%	10%	5%	40.32%
3	Crew Size	Four	Three	Two	One	41.53%
4	Crew Size	73%	20%	5%	2%	41.53%
5	Container	Basket	Plastic	Metal	Bags	47.71%
6	Container	50%	35%	10%	5%	47.71%
7	Disposal	Landfill	Incineration	Ocean	Chemical	50.24%
8	Disposal	84%	10%	5%	1.0 %	50.24%

[a]Municipal Solid Waste Management and curbside collection

2.0 METHODOLOGY

The researcher developed an on-line research instrument which was administrated to a convenience sample of young logistics professionals from all parts of Thailand. Of the 42 respondents 42% were male and 58% female logistics management professionals who shared their perception of the Municipal Solid Waste (MSW) management practices in their region focusing on curb side garbage collection and disposal. The findings were summarized and statistically analyzed with SPSS.

3.0 RESULTS AND DISCUSSION

The results of the study can be summarized in three areas namely, garbage containers, garbage truck and disposal method utilized in Thailand.

3.1 Garbage Containers

There is a large variety of garbage containers ranging from natural material waste baskets, mostly hand- made, metal and plastic garbage cans as well as plastic garbage bags. Predominatly (50%) the garbage is collected in baskets and brought to the collection truck. Plastic garbage cans (35%) are gaining market share over metal garbage cans (10%) which are less popular in Thailand. Plastic garbage bags are still in its infancy (5%), especially garbage bags which include disposal fees in the purchase price [5].

3.2 Garbage Truck

The majority of garbage trucks are rear loader (70%) with compaction, followed by side loaders (15%) which are the exception as well as dump trucks (10%) and front loaders (5%). The majority of trucks (73%) use a crew of four including the driver and three loaders. Only 20% of the crews only have three

members which is the exception rather than the norm. A team of one driver and one loader is very seldom (5%). And fully automated trucks with only a driver are more or less experimental with 2%. [6].

3.3 Garbage Disposal

The majority (845) of household garbage is still disposed of in landfills. Incineration is seen as the solution for the future but currently only 10% is being incinerated. While 5% of the waste may end up directly or indirectly in the ocean. Only rare special applications (1%) use chemical methods to dissolve the waste [7]. Figure 1 shows the block diagram of Thai waste management.

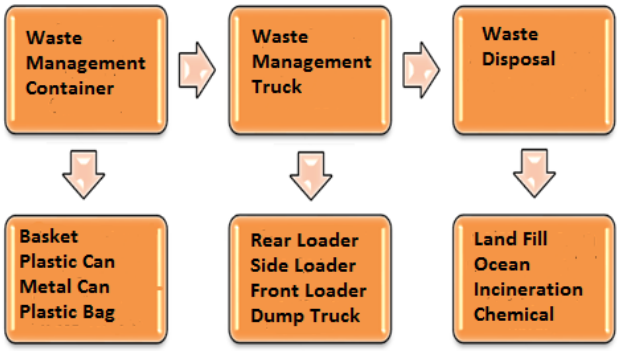

Figure 1 Block diagram of Thai Waste Management

4.0 CONCLUSION

Thai waste management as an interesting history and an even more promising future. It was found that the majority of locations still use handmade garbage baskets to transport the domestic waste from the household to the curb side where it is sorted by the garbage collection crew for valuable resources such as plastic and metals which are later sold by the collection crew to substitute their income. Metal trash containers are less popular but plastic garbage cans are readily taking over atleast in Bangkok and larger urban areas. Plastic bags may be used for overflow but are not sold by the municipality which charges 240 baht (ca. US$8) annually to collect the garbage [8].

The Bangkok Metropolitan Authority just in recent years purchased a new fleet of green rear compaction garbage trucks. Side loaders are used in some areas these are smaller trucks and more for special applications. US style front loaders with overhead dump are the rare exception, as dumpsters are less popular. In rural areas dump trucks are still for collection. The collection crew usually consists of one driver and three collectors. Most of the garbage collection and transport is done in a single milk-run [9] during the night time 9 PM-6 AM to avoid traffic.

The garbage is mostly disposed in landfills, in recent years Bangkok had some large landfill fires at illegal dump sites. The fines for illegal dump sites are relative low compared to the cost of the approval process. There is also a plan to incinerate the garbage in Thailand and this large scale projectsaims to combust 80% of the waste in more than ten power cogeneration plants. In January 2013 a Municipal Solid Waste (MSW) Incineration Power Plant was opened in Phuket which can burn 700 tonnes per day and generate 14 MW of power [10]. Despite all efforts some waste still ends up in the ocean especially at the beach front communities and chemical disposal of waste is reserved for specialty applications [11]. But in the light of ASEAN and constant efforts to go Green and create a sustainable supply chain with reverse logistics Thailand will enhance its waste management efforts and make it mutual beneficial to all stake holders. It is recommended to replicate this study at larger scale in Thailand and throughout ASEAN to make it a comparative study over time, to see how industry best practices can be applied in a local setting meeting the needs of emerging markets. Figure 2 shows the Thai waste management present to future.

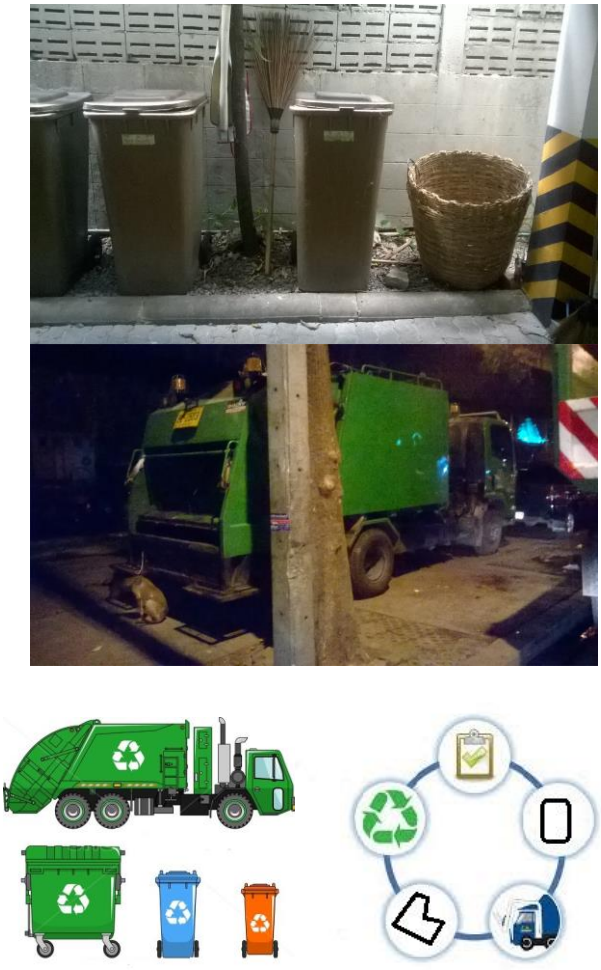

Figure 2 Thai Waste Management Present to Future

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