

## Behavioral Study of Local Three Wheel Motor vehicle Skylab and Sidecar in Urban Area of Khon Kaen Province Thailand

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### Abstract

**Background:** Road traffic accident are increasing to be the major cause of global population injuries and death both in urban and rural areas including local road and local vehicle.

**Method:** Survey research for behavioral study of local three wheel motor vehicle skylab and sidecar in Khon Kaen province Thailand. Participants were drivers 258 persons both Skylab and Sidecar drivers. Including government officer such as policeman transportation officer and academic expert. Data were collected by questionnaire and guideline interview. Data collection both quantitative and qualitative data. Content analysis for qualitative data and descriptive statistics for quantitative data were used by STATA Program.

### Research Results:

**Cause of using Skylab & Sidecar** was Large enough, easy to parking, not strictly from policeman, not expensive, suitable, convenient and could earn money.

**Problem of using** were traffic jam, illegal, limited location for service, no license non standard, motor pollution, loud and slowly.

**Safety Behavior of Driver** were most of driver use helmet, high speed, traffic rule respect, no license, no practice and no checking before driving.

**Policy formulation** the government should concern about registration, legal, standard, queuing, surveillance and alleviation, license, insurance and driver training.

**Keywords:** Behavioral, Three Wheel Motor vehicle, Skylab, Sidecar, Khon Kaen Province

### 1. Introduction

Traffic accident is serious problem in world wide now. The World Health Organization (WHO) is taking a bold step forward by addressing road traffic injuries as a preventable global health problem<sup>[1,2,3]</sup>

The comparison of traffic accident among ASEAN country found that Malaysia is highest number of death 25.0 per 100,000 population and Thailand is second 22.9 per 100,000 population the trend of number of accident fatalities per 100,000 population and per 10,000 vehicle during 1997-2007 are stable until right now no decreasing<sup>[4,5,6,7]</sup> Although Thai government alert to alleviation this serious problem.

Accidents in developing countries are higher by 10-40 times than in developed countries. The number of people are killed on road traffic accident each year approximately to 13,000 while the number of injured could be as 1 million. In the years 2003 and 2004 there were 65,932 and 86,528 accidents, with 46,035 and 80,305 injuries as well as 11,252 and 13,836 deaths and increased died to 13,996 and injured 973,104 in 2006. <sup>[8,9]</sup> It can be said that traffic accident is serious problem for along time until right now. Although the government try to motivate and campaign especially in the important occasion. Traffic accident still outstanding problem and effect to the people both in urban and rural area.

Traffic accidents are a serious problem in Thailand in every province. This leads to Public Health, economic and social problems. The number of people are killed on road traffic accident each year approximately to 13,000 while the number of injured could be as 1 million. In the years 2003 and 2004 there were 65,932 and 86,528 accidents, with 46,035 and 80,305 injuries as well as 11,252 and 13,836 deaths and increased died to 13,996 and injured 973,104 in 2006. (Ministry of Public Health, Thailand, 2006) Mostly impact group appear in labor 37.9% student 18.6-19.9% and other 15 %. In 2006 TDRI estimated economic lose about 106,994 -115, 337 million baht or 2-3% of GDP <sup>[8]</sup>

Traffic accidents have been the third cause of death since 1969 until now. The trend of traffic accidents is increasing rapidly. Although the Thai governor alert to implemented to tackle traffic problem.

Motorcycle is the most traffic accident cause and injured the people for along time including in the present also. Because motorcycle is low price, convenient using, furthermore the owner of motorcycle try to use motorcycle effectively by construct the tow beside motorcycle for carrying something and passengers in nearby their home town, such as in

khon kaen province. We can see three wheel motor vehicle generally in urban area, although it's illegal vehicle.

Three wheel motor vehicle especially sidecar is a vehicle which conducted tow in the right or left side of motorcycle, 1 meter square, add fix other 1 wheel for carrying, almost of user are middle age people with their family or children, some for carry out goods from the market to their home and elsewhere. This vehicle is illegal and always risk to accident.

Skylab is one kind of three wheel vehicle like TUK TUK, but low quality and cheaper than TUK TUK. Which use for transport people mostly at districts for low income people conducting by industry but not enough quality for distant, it appropriate in rural area or not traffic jam especially in rural area.

Preliminary study by interview transportation officer and policeman the transportation officer mentioned in “Thailand has no legal to support the three wheel motor vehicle. Three wheel motor vehicle are modifying vehicle. Mix part of motorcycle that made from the metal which under standard. It's come from illegal shops which open for the people who tend to make sidecar for their motorcycle. Sidecar which make for carry the stuffs, most for trading.” In Thailand, we don't have three wheel motor vehicle patterns which are really designed from industry because it too high investing and expensive and the people cannot accessible. About the Three wheel motor vehicle register, they do by take the sidecar off when they come to transportation office for make registered. The transportation staffs don't even notice that this motorcycle is such a kind of three wheel motor vehicle already. Now we don't have any measurement that can prohibit some people to make sidecar for benefit. Only the police try to arrest the people who own or drive sidecar but can only do just a period of time. In spite of the police arrest them but no achievement.

They try to break the law and had demonstration about arrested them last year. The people who using sidecar mentions please don't stop them because they earn some money from Three wheel motor vehicle. So now the police indulgent for them but seems to be cannot stop them anymore. About the accidents which occurred from three wheel motor vehicle also had sometime but every time the police recorded that accident only from general motorcycle. So we didn't have real clue to specific about this problem. Nothing can guarantee about accident when the car hit in sidecar then people who sitting there die and cannot get insurance claim because of insurance cannot protect sidecar as a law<sup>[10]</sup>

Three wheel motor vehicle both skylab and sidecar become way of life of poor people. Some lead to cause of accident and no...concern from policy maker...and lack of research about Three wheel motor vehicle driving behavior both skylab and sidecar. Three wheel motor vehicle in this research focus both Local Three wheel motor vehicle so called Skylab usually transport in District area and sidecar so called rot motorcycle-puong usually transported in urban area.

Khon Kaen located in the Northeast of Thailand far 500 Km from Bangkok capital of Thailand. There are 26 districts. There are various transportation in Khon Kaen such as airplane, train, bus, three wheel motorcycle such as Tuk tuk, sidecar, skylab, motorcycle, bicycle three wheel without motor.

However three wheel vehicle sidecars are popular in low income people, for transfer well and some transport for poor people in urban area in the city. Meanwhile skylab is most popular in district for transport the people and transfer goods among poor people also. But the research or study about these vehicles is seldom.

Researchers are concerned about this problem so would like to study for further improvement quality of life of the peoples.

## 2. Research Objectives

1. Study causes of Using Three wheel Vehicle both Skylab and sidecar in Urban Area Khon Kaen.
2. Study problems of Using Three wheel Vehicle both Skylab and sidecar in Urban Area Khon Kaen
3. Study safety behaviors of Three wheel Vehicle both Skylab and sidecar drivers.
4. Study Three wheel Vehicle Policy formulation guideline both Skylab and sidecar.

## 3. Procedure Material and Method

The study design was descriptive study design and will be study both quantitative and qualitative method.

The populations and samples in this study were three wheel Motorcycle Vehicle Drivers, and administrators in Khon Kaen Province Thailand. 258 cases in Muang District for Sidecar KuasuanKuang District, Ban Phi District and Namphong district for Skylab, Khon Kaen Province., Thailand. The questionnaire interview and qualitative method by In-depth interview and focus group discussion for data collection. On the other hand administrators such as policeman, transportation, academic expert 10-15 persons were including for qualitative data collecting as well.

The variables of this study will collect by structural questionnaires which answer the aims of the study by literatures reviews. The questionnaires consist of 5 sections such as 1.) personal data, 2.) cause of using three wheel motor vehicle 3.) problem of using three wheel motor vehicle 4.) traffic accident prevention behavior of drivers. 5.) policy guideline for three wheel motor vehicle

## Data management and analysis

### Quantitative data

The data was recorded into the computer base on double data entry procedure by researcher's assistants using program STATA. The analyses was taken place in order, starting from descriptive statistic for percentage, standard deviation, arithmetic mean.

Tools for qualitative methods Qualitative data.  
 1) In-depth interview target samples about policy implication and recommendation for Three wheel Motor Vehicle with administrators in Khon Kaen Province.

#### Data analysis

- Quantitative data using frequency distribution, percentage, mean standard deviation.
- Qualitative data used content analysis

## 4. Results

### 4.1 General Characteristics of Skylab’s drivers and Sidecar’s driver in communities

The total sample consisted of 258 drivers. Skylab’s drivers of 130 persons and Sidecar’s drivers of 128 person. Most of them had age of 41-45 years (20.54%), were male and were owner house (86.82%). Education was primary school and Junior high school at 151 and 19.38%, 90.70% were married, Income per month was less than 5,000 baht, Duration of using a car was less than 5 years (38.37%), satisfaction in a car was high satisfaction (73.64%), and attention to using a car was Use continue at 251. The details are shown in Table 1.

**Table 1** Number and Percentage of Personal Data (n=258)

Socio-demographic characteristics	No (n=258)	Percentage
1. Type of car		
Side car	130	50.39
Skylab	128	49.61
2. Age		
Less than 15 Years	1	0.39
15-20 Years	4	1.55
21-25 Years	7	2.71
26-30 Years	17	6.59
31-35 Years	42	16.28
36-40 Years	37	14.34
41-45 Years	53	20.54
46-50 Years	44	17.05
51-56 Years	31	12.02

57-60 Years	11	4.26
More than 60 Years	11	4.26
3. Address		
Owner	224	86.82
Rent house	24	9.3
Other	10	3.88
4. Education		
Primary school	151	58.53
Junior high school	50	19.38
High school	32	12.4
Vocational certificate	16	6.2
High vocational certificate	4	1.55
Bachelor’s degree	2	0.78
other	3	1.16
5. Marital Status		
Single	20	7.75
Married	234	90.7
Divorce	4	1.55
6. Income per month		
Less than 5,000 Baht	123	47.67
5,001-10,000 Baht	84	32.56
10,001-15,000 Baht	46	17.83
15,001-20,000 Baht	3	1.16
20,001-25,000 Baht	2	0.78
7. Duration of using three wheel vehicle		
Less than 5 years	99	38.37
6-10 years	81	31.4
11-15 years	56	21.71
16-20 years	11	4.26
More than 20 years	11	4.26
8. Satisfaction of three wheel vehicle		
High satisfaction	190	73.64
Moderate Satisfaction	68	26.36
9. Attention to using three wheel vehicle		
Use continue	251	97.29
No use anymore	7	2.71
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#### 4.2 Evolution of three wheel vehicles

The total sample consisted of 258 drivers. The price of the cars was 24,001-46,000 Baht, Price of construct the tow was 6,751 baht up, and how many three wheel vehicle was used was the first (70.93%) (Table 2)

**Table 2** Number and Percentage of evolution of three wheel vehicle

Items	Number	Percentage
1. Price of the car		
Less than or equivalent 24,000 Baht	85	32.95
24,001-46,000 Baht	91	35.27
46,001-68,000 Baht	58	22.48
68,001 up	24	9.3
Max-Min = 90000 -2000		
$\bar{X} \pm SD = 34819.44 \pm 20637.42$		
2. Price for construct tow		
Less than 2,250 Baht	28	10.85
2,251-4,500 Baht	69	26.74
4,501-6,750 Baht	19	7.36
6,751 up	142	55.04
Max-Min = 9000 - 0		
$\bar{X} \pm SD = 3484.27 \pm 1776.16$		
3. How many three wheel vehicle was used		
The first	183	70.93
The second	58	22.48
The third	10	3.88
The fourth	2	0.78
The fifth	5	1.94

#### 4.3 Using three wheel vehicles

The purpose of using three wheel vehicles was private using at 146 person (56.59%), the type of goods was others at 43 (16.67%), Skylab for transport the people anywhere was others at 36 (13.95%), Useful for family of skylab's drivers (sample 42 persons) and sidecar's drivers (sample 173 persons) was income less than 500 baht, at 38 and 156, Income enough as purchase or invest was enough (77.64%), this car increasing convenient was yes (92.64%), how long and long time for using this car per day was only day (73.26%) and less than 6.5 hours (55.81%) and mainly using car was use car only for occupation at 140 (54.27%). (Table 3)

**Table 3** Number and Percentage of Using three wheel vehicles

Items	Number	Percentage
1. The purpose of using three wheel vehicle		
Transportation People per time	85	32.95
Transfer goods	53	20.54
Others	10	3.88
Private using	146	56.59
For Selling	86	33.33
2. Type of Goods		
Steamed dumpling	5	1.94
Noodle	8	3.1
Meat ball	14	5.43
Fruit	8	3.1
Beverage	17	6.59
Miscellaneous	3	1.16
Papaya salad and chicken grill	3	1.16
Others	43	16.67
3. Skylab for transport the people anywhere		
Hospital	30	11.63
Police station	27	10.47
District hall	29	11.24
Train station	32	12.4
Others	36	13.95
4. Useful for family (Sample 42 persons)		
Income less than 500 Baht	38	14.75
501-1,000 Baht	1	0.39
1,001-1,500 Baht	1	0.39
1,501 Baht up	3	1.17
5. Useful for family (Sample 173 persons)		
Income less than 500 Baht	156	90.18
501-1000 Baht	12	6.94
1001-1500 Baht	3	1.74
1501 Baht up	1	0.58
Income enough as purchase or invest		
Enough	191	77.64
Not enough	55	22.36
6. This car increasing convenient		
Yes	239	92.64
No	19	7.36
7. How long for using this car per day		
Only day	189	73.26
Only night	3	1.16
All day and night	66	25.58

8. How long time for using this car per day		
Less than 6.5 hours	144	55.81
6.51-12.50 hour per day	109	42.25
12.51-18.50 hour per day	4	1.55
18.51 hour up	1	0.39

Items	Number	Percentage
Min-Max = 0.5 -24		
$\bar{X} \pm SD = 6.18 \pm 3.1$		
9. Mainly using car		
Use car mainly for occupation	140	54.27
Use this car some time because have the main occupation	122	47.28

#### 4.4 The problem of using car

Almost no problem of driving 251 (97.29%), no checking from policeman was 243 (94.19%), and no Queuing system was 255 (99.22%). (Table 4)

**Table 4** Number and percentage of the problem of using car

Items	Number	Percentage
1. The problem of drive or traffic		
Yes	7	2.71
No	251	97.29
2. Checking from policeman		
Yes. How	15	5.81
No	243	94.19
3. Queuing system		
Yes. Manager was	2	0.78
No.	255	99.22

#### 4.5 Safety behavior for using this car

Almost driver no has the register ID.Card (71.21%), They get ID.Card by Test (98.65%), No practice before using car (62.83%), no traffic accident experience (91.09%), character of accident was Moderate (70.37%), not severe or not of accident (94.19%), using traffic light before turn (84.11%), no reflect sticker (53.49%), always no using helmet (53.88%), no turn light before in the curve road (49.61%), car checking before using (74.03%), and no speed over law enforcement (79.84%) (Table 5)

**Table 5** Safety behavior for using this car

Items	Number	Percentage
1. Register ID. Card		
Yes	74	28.79
No	183	71.21
2. How get ID card		
Test	73	98.65
Others	1	1.35
3. Practice before using car		
Yes	71	37.17
No	120	62.83
4. Accident		
Yes cause	23	8.91
No	235	91.09
5. Character of accident		
Strongly	8	29.63
Moderate	19	70.37
6. Severe or not of accident		
Yes	15	5.81
No	243	94.19
7. Using traffic light before turn		
Yes	217	84.11
No	41	15.89
8. Reflect sticker		
Yes	120	46.51
No	138	53.49
9. Always helmet use		
Sometime	80	31.01
Always	39	15.12
No using	139	53.88
10. Turn light before in the curve road		
Sometime	54	20.93
Always	76	29.46
No using	128	49.61
11. Car checking before using		
Yes	191	74.03
No using	67	25.97
12. Speed over law enforcement		
Sometime	47	18.22
Always	5	1.94
No using	206	79.84

#### 4.6 Opinion to improving both of cars

The cars was the register (56.20%) and no intention to cancel using this car (90.31%) (Table 6)

**Table 6** Number and percentage of Opinion to improving both of cars

Items	Number	Percentage
1. Register this car		
Yes	145	56.2
No	113	43.8
2. Cancel using this car		
Yes	25	9.69
No	233	90.31

#### 4.7 The result from Focus Group Discussion among sidecar drivers.

1. Mr.C. Ten years ago using sidecar, 2<sup>nd</sup> car for selling salapao, noodle, coffee in summer in the cerebrate/ festival, use helmet some time. No accident. It's comfortable and good enough.

2. Mr.U. Using 15 years selling salapao in festival, drive 40-50 km per hour. Using helmet always, has accident not severe.

3. Mr.S. 10 years using, Supporting from Lanset project for road cleaning. Collect old thing for selling. It's convenient, love, it.

4. Mr.W. 10 years using car. Lanset project support. Wake up 3 am for road cleaning. Collect old thing for buying, Satisfy this car, happy and useful convenient. His second occupation is cloth serving, drive 40-50 km per hour and use helmet always.

5. Mrs.Ur. use 10-15 years. Selling papaya salad, sticky rice, and chicken grill everyday until 9.00 am-6.00 pm. No accident, drive not fast and use helmet always.

6. Mr.K. six months to using sidecar, work 2 period per day. Fruit selling, Soap tooth brush, detergent, sometime unhappy for using sidecar because. He worked in company and good greasing but now feel better because it's freedom, income more than 200-300 Baht. Second period selling fruit low invest but more benefit from this car, use always helmet, no accident, some time many other sidecar.

#### 4.8 The results of Sidecar Driver Indebt interview

Mr.S. He is 54 years old. Worker at day care. Start working at 4.00 am to cleaning at community, 7.30 am send student to school and work at day health station. 4.30 pm. Pick up children from school, 5.00 pm prepare far aerobic and work at day care 8 pm-6 am.

Mr.S.K. He is 47 years old. His occupation is salapao selling 191/10 Samliam 2 community. He start work 6 am. and working salapao. Salapao selling at 2.30 pm and return home 2 am.

Mr.U 56 years old grocery selling. 40/111 Samliam 4 community. 5 am open his shop, 8 am buying goods at market, 11 am buying old thing, 1 pm. work at community office, 4 pm. visit his sister at kokfunpong village and return home 6 pm.

#### 4.9 Skylab Driver Indebt interview

Mr.S.A. He is 49 years old. Start to used skylab since 2538. Income 150 Baht / days. Skylab driving is main occupation. He start work at 6 am, sent passenger to market 20 Baht, sent passenger to Ban Kono 100 Baht. Have launch at home, start work 10 Baht, go to village 30 Baht, sent passenger to Khowsuankwang hospital 10 Baht and turn home at 6 pm. Total 240 Baht per days.

Mr.S.J. 49 years old. Address is Ban Koke Khowsuankwang sub-district Khowsuankwang district KhonKaen province. Work only free time form rice farm.

11.00 am Sent monk to market 60 Baht, 12 am launch at home, 3.00 pm. come to station, 5.00 pm sent passenger go khummoung village and return home 6.00 pm. Total income 110 Baht per day.

Mr.T.C. 49 years old. Address is Ban Koke Khowsuankwang sub-district Khowsuankwang district Khon Kaen province. Second skylab. Start at 6 am. no passenger until 12.00, have launch at home, about 1.00 pm sent student 2 persons receive carfare 50 Baht, 4.00 pm sent passenger to market 10 Baht, sent gas to market 10 Baht and return home 6 am. Total income 70 Baht per day.

#### 5. Causes of using skylab and side care. Almost of drivers agree that they use three wheel motor vehicle : skylab and sidecar because these car many useful such as :

- Occupation
- Oil saving
- Convenient Comfortable
- Earn money
- Private using, carry out goods
- Convenient for long distant from one district to other districts.
- Good condition car
- Private occupation without be employee and earn more money
- Not fall and convenient
- Carry out more goods, and can take and pick up children to school

#### 6. Driver's Impression. Most of driver impress of using both skylab and sidecar with many reasons:

- “Sidecar help to earn money, make security and qualities of life” “My children graduate from the University and get good job because of Sidecar.
- “I love sidecar, it take me and family every where”.
- “I sell salapoa in day time and meat ball in the night time”
- I have net work of sidecars. Sidecar make me and my friends earn money and self reliance.
- I work in the office in the morning in daytime I use sidecar at 3 am. for garbage carrying everyday.
- It makes my life and family get more convenient and earn money everyday by transport the people to anywhere: hospital, police station, market, city hall.
- It's not too expensive it suitable for us, so I don't need improving it, I think it ok.



## 7. Policy implementation for Skylab using:

1. It should training driver before using.
2. The license making should be conducted.
3. Queue management should have performed.
4. Motor standard checking.
5. Motor register correctly.
6. Depend on the policy of the Military

Transportation.

7. Queue management will be need.
8. There is the specific license for tricycle motor.

## Policy implementation for Sidecar using:

1. It's Should have the riding training but must have the participation from other organization such as the transport office.

2. Motor registration
3. It's should not have the register because it can use the register in the same of motorbike.
4. Queue management
5. It should rider training because there is someone who does not have skill to use.
6. There are trainings about the side tow motorbike riding often.
7. License Making
8. Can use the normal motorbike's license.
9. Should have training to know about the traffic law.

10. Motor standard checking
11. It should manage to standard for safety of rider.
12. Should have the standard management because the motor does not strong enough
13. If there are breaking the traffic law, they will have arresting normally, strict about loud sound of motor, the toxic fumes and the license.

## 8. Conclusion

Survey research for behavioral study of local three wheel motor vehicle skylab and sidecar in Khon Kaen province Thailand. Participants were drivers 258 persons both Skylab and Sidecar drivers. Including

government officers. The people preferred to use **Skylab & Sidecar because** they large enough, easy to parking, not strictly from policeman, not expensive, suitable, convenient and could earn money although they had any problem and risky car. However the government should concern about registration, legal, standard, queuing, surveillance and alleviation, license, insurance and driver training for increasing quality of life and safety of the people .

## 9. Discussion

The people need to use skylab & sidecar due to many reason such as large enough, easy to parking, not strictly from policeman, not expensive, suitable, convenient and could earn money. Especially it convenient to going anywhere especially for low income people. Therefore improving standard is very important both body of car and system management to be legal system such as licensing, traffic rule. Including registration of both skylab and sidecar. Furthermore it should concern about management system by government for setting the queuing, safety surveillance insurance and driver training. On the other hand both of these car should be motivate for tourist by making smart car for foreigner also.

## 10. Recommendations

### 10.1 Recommendations for Skylab:

1. Polices have strict in some chances like the general traffic control or in the time that the traffic crowded or depend on the specification of the police.
2. Not sure, the police impossible to strict very because almost are used in the countryside area.
3. It is illegal because of is the modified motor that not permitted if violate a law will be fined not exceed 1,000 baths.
4. Forbid to drive the Skylab in urban area.
5. Very strict because the Skylab is still illegal if take it in urban area must be arrested and be fined not exceed 1,000 baths with allegation of modify the motor.

6. Very strict, forbid to use in urban area.
7. There are strict to do correctly according to law if do illegally will be arrested and fined.
8. Strict about the license, motor system management, black smoke or loud sound.
9. Strict because of used not to see the Skylab in urban area. It still does not be permitted from the officer or may be illegal because it has not registered correctly.

#### 10.2 Recommendations for Sidecar:

1. It may be strict in some chances such as in the important festival, the traffic crowd, etc.
2. There are checking and arresting and forbid to run in the night.
3. It possible to strict in some time
4. Strict a little because if the police strict, it will not has many side tow motor in urban area like this.
5. The police have lessened for the structure expansion but forbid to transport the passenger strictly because it is very dangerous, allow transporting the thing only.
6. The rider must wear the helmet every time and must have the license.

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