



global Transport
Knowledge Partnership

Vietnam Intermediate Transport Review



*Bach The Dzung
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Foreword

This report has been initiated and funded by the global Transport Knowledge Partnership (gTKP) for the benefit of developing and transition countries.

The gTKP is a platform for making effective use of the best available transport knowledge and facilitating strong participation from developing and transition countries.

gTKP is driven by the needs of its users and has a strong focus on the participation of transport practitioners around the world. Through its work, gTKP arms practitioners with knowledge and builds partnerships to improve decision making and help to alleviate poverty.

gTKP's focus is on long-term capacity building to deliver an effective approach to tackling world transport issues. Its overall goal is to contribute to the achievement of the Millennium Development Goals through transport knowledge.

For further details, visit the website on: www.gtkp.com

This report is aimed at persons or organizations interested in facilitating low cost transport services for poor communities in developing countries and those in transition. The report illustrates the potential for the introduction of intermediate transport vehicles to benefit the rural transport and agricultural sectors, and highlight some of the issues to be considered.

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TABLE OF CONTENTS

| | |
|----------------------------------|----|
| Foreword..... | 2 |
| Abbreviations and Acronyms | 4 |
| EXECUTIVE SUMMARY | 5 |
| 1. Introduction | 6 |
| 2. Commentary..... | 8 |
| 3. Conclusions | 10 |

Appendices:

Appendix 1- The Summary: Characteristics of Typical Cong Nong/mini trucks in Vietnam

Specifications of Cong Nong in 6 provinces in Vietnam:

Appendix 2- Technical specifications of Cong Nong – Tuyen Quang province.

Appendix 3- Technical specifications of Cong Nong – Ninh Binh province.

Appendix 4- Technical specifications of Cong Nong – Nghe An province.

Appendix 5- Technical specifications of DAMCO – Da Nang province.

Appendix 6- Technical specifications of Cong Nong – Dak Lak province.

Appendix 7- Technical specifications of Cai Tien – Dong Thap province.

ABBREVIATIONS AND ACRONYMS

| | |
|-----------|--|
| approx | approximately |
| Cong Nong | Locally made small truck |
| gTKP | Global Transport Knowledge Partnership |
| hp | horsepower |
| km | kilometre |
| kph | Kilometres per hour |
| kW | kiloWatt |
| N/A | Not Available |
| No. | number |
| RRSR | Rural Road Surfacing Research |
| SEACAP | South East Asia Community Access Programme |
| T | Tonne |
| VND | Vietnam Dong (currency) |
| 2WD | Two Wheel Drive |
| 4WD | Four Wheel Drive |

EXECUTIVE SUMMARY

The global Transport Knowledge Partnership (gTKP) has identified the positive benefit of locally made, light vehicles (Cong Nong) in Vietnam as a means of providing low cost transportation for rural communities. These vehicles are believed to have made a contribution to the remarkable success of the agricultural sector and national poverty reduction initiatives in recent years.

The Government of Vietnam is taking steps to now restrict the use of these vehicles, as the rapid development in the country makes more advanced, mass production vehicles more widely available. These moves are generating vigorous local debate regarding impact on existing vehicle owners and the poor who have depended on these reasonably priced vehicles and their low cost of operation.

There is a strong argument for flexibility in the improved regulation of small scale manufacture of intermediate transport equipment and for continuing to benefit from the skills, ingenuity and cost base of local manufacturers to keep transport costs low, to the advantage of the rural and poor communities.

This report has been commissioned to document the knowledge of these vehicles in Vietnam, their benefits and possible contentious issues, so that communities within Vietnam and in countries with similar challenges and characteristics can benefit from sharing, discussing and applying this knowledge.

It is possible that other developing countries could benefit from the introduction of low cost locally assembled or fabricated light vehicles and the resulting reduced transport costs. It is appropriate that issues of regulation, licencing, fiscal environment, promotion, support, skills development, training and mentoring should be considered in a national context.

1. Introduction

Rural Transport is a vital 'enabling' component of a developing country economy that will contribute substantially to the achievement of the high profile social and economic Millennium Development Goals (MDGs).

The Rural Road Surfacing Research (RRSR) programme in Vietnam, supported through the South East Asia Community Programme (SEACAP) has an objective of using local resources; including materials, enterprises & local equipment, to contribute to providing low cost transport infrastructure and services to rural communities. This includes job opportunities for local people in the road works and transport sector.

The global Transport Knowledge Partnership (gTKP) has identified the positive benefit of locally made, light vehicles (Cong Nong) in Vietnam as a means of providing low cost transportation for rural communities, which is believed to have made a contribution to the remarkable success of the agricultural sector and poverty reduction initiatives in recent years.

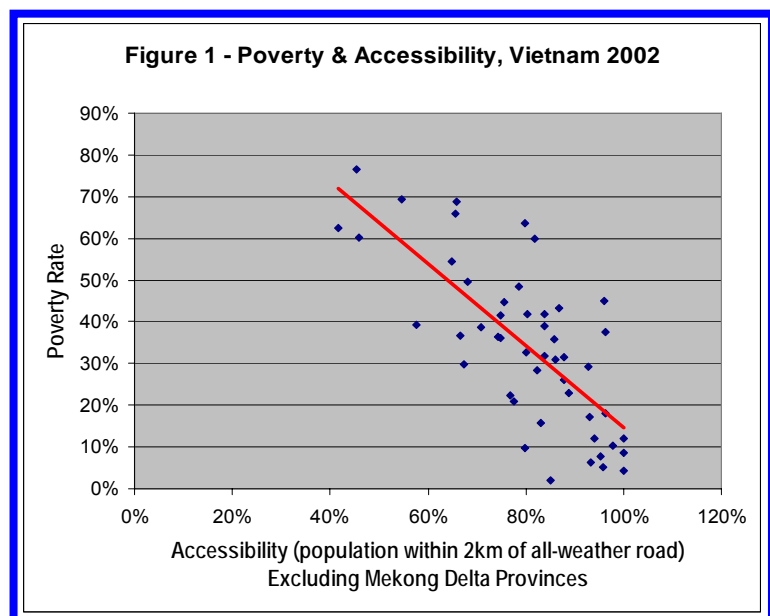
This report has been commissioned to document the knowledge of these vehicles so that communities within Vietnam and in countries with similar challenges and characteristics can benefit from sharing, discussing and applying this knowledge.

Vietnam has made substantial advances in the recent decades in agricultural production and poverty reduction. The World Resources Institute statistics (www.wri.org) indicate that cereals production in Vietnam increased 198% to 33.9 million metric tones between 1979-81 and 1999-2001.

The poverty rate (as measured by per capita consumption) fell from 58.1% in 1993 to only 19.5% in 2004¹.

Although factors contributing to this success must undoubtedly include legal and governance framework, increased use of fertilizers etc., the wide availability of low cost transport has enabled the agricultural inputs to be delivered in a timely way, and crops to be harvested and efficiently extracted from farmland at modest cost, minimizing wastage and allowing access to markets.

Government surveys have shown the strong link between access and poverty (Figure 1).



Source: Vietnam 2002 Living Standards Survey

¹ Vietnam Academy of Social Sciences (2006), Vietnam Poverty Update Report 2006: Poverty and Poverty Reduction in Vietnam 1993-2004.

The ready availability of low cost means of transport, shown in Figures 2, 3 and 4, enable the rural communities to benefit socially and economically from the all-weather transport infrastructure.



Figures 2, 3 & 4 – Low cost means of transport widely available in Vietnam

There is a widespread established use of locally made small trucks in almost all provinces of Vietnam. Very low cost: ‘Cong Nong’ mini trucks have been widely available from regional assembly enterprises with a new purchase cost in the range of about US\$950 to US\$3,125 equivalent, with a carrying capacity from 1 to 3 tonnes. With the same carrying capacities, the mini trucks of state owned factories, based on foreign corporations’ designs cost new in the region of US\$9,000 to US\$14,500 equivalent. Ownership costs for a small Cong Nong are substantially less than for modern trucks, with assessed simple daily depreciation of US\$0.22-0.43/day compared to US\$1.25-1.64/day equivalent, without considering finance and discounting factors (Appendix 1, Item 19). The low initial cost of Cong Nong is not the only benefit of these vehicles. There are other advantages of the local use of these vehicles; the jobs of local people created (local manufacturers’ and operators’ employment), local fabrication of accessories, low hire rates, and low costs of goods and people transportation. Poor people have opportunities to use cheap, widely available transport services contributing to the government’s poverty alleviation and price inflation control goals. The Cong Nong are generally able to traverse poor quality roads throughout the year, and fields during dry weather for harvesting purposes.

Typical local hire rates range from the equivalent of US\$4-6/day for the vehicle and driver, with goods transport charge rates of US\$0.3-0.7/tonne-km.

The word Cong Nong translated is literally the “Worker and Farmer” indicating the worker-agriculture connection. This name appeared after 1975, when the Chinese government helped Vietnam with some mini tractors for agriculture development. This is a low cost, multi-function type of equipment; carrying goods, driving water pumps, rice-husking, ploughing, raking, milling, transporting construction materials etc. With the introduction of this equipment in Vietnam, there was a marked substantial change of agricultural labour efficiency. Some enterprises in Vietnam started to manufacture these tractors, often using imported, low cost, Chinese engines or re-cycled ones. The famous marks were Bong Sen & Co Loa mini tractors. The Cong Nong became the generally adopted name for locally made mini trucks or vehicles.

Over the last 8 years, the use of mini vehicles has become widespread in most of the provinces of Vietnam. The fabrication structures of these vehicles are similar, with chassis-frame, typically using the recycled parts of second hand cars or trucks, such as the platform

or frame, transmissions, clutch, wheels, axles, engines and other components, which are adapted or are purpose self made. These vehicles have been made by co-operatives and private workshops, generally with no formal design processes, and no registration or licencing formalities.

The vehicles are generally low powered and low speed, so that they do not pose the same safety concerns as modern higher powered and faster goods and passenger vehicles.

The engine power is generally about 15 horsepower (11kW) and higher, with carrying capacity about 1 tonne to 3 tonne. Costs 'new' are low; from about VND15million to VND50 million (from US\$950 to US\$3,125) in April 2008.

This report documents the key features of some of the common Cong Nong mini vehicles.

It is apparent that the flexibility of the legal framework to allow these low cost, slow speed vehicles to be made and used in Vietnam to date has made a major contribution to the 'enabling environment' and the availability of low cost transport for rural communities. It would be necessary to have a similar accommodating legal framework in other countries interested in adopting a similar approach to that successfully made by Vietnam.

It is interesting to note that having provided a substantial boost to agricultural production the government now sees the rural economy moving to the next phase of development, with the role of the Cong Nong being phased out and superseded by more modern mass produced vehicle designs (see below). As traffic on rural roads increases substantially and speed differentials become a safety concern on main public roads the Cong Nong use may become more confined to rural and farm road, and field use.

Appendix 1 provides a general summary description of the various Cong Nong. Appendices 2 to 7 provide details of Cong Nong Manufactured in six of the provinces studied.

2. Commentary

Advantages: As described above, Cong Nong have a number of advantages: No currently available vehicles in Vietnam are better designed than the Cong Nong concerning the aspects of multi-function, cheap initial cost, low maintenance costs, able to traverse bad/damaged/narrow roads, manoeuvre with a turning circle of diameter of about 4 or 5 metres. Good parts & accessories from scrap secondhand vehicles can be recycled. Some engines, gear-boxes and transmission are of Vietnamese or Chinese origin (cheap and readily available) new or reconditioned. In almost all provinces in Vietnam (and even at district level), there are established Cong Nong manufacture workshops (fabrication plants). They have created productive jobs for many local people (manufacture, operation, maintenance and repair). Local people can benefit from low cost services. In many rural towns there are locations with Cong Nong available for daily hire. Cong Nong use has contributed to controlling the price inflation and supporting the poverty alleviation policies of the government.

Disadvantages: There are no standard designs of Cong Nong. Some Cong Nong are assembled from parts and accessories of secondhand or scrap vehicles (trucks, buses, cars). There is no registration or fit-for-purpose control, which raises concerns for safety of operators and other road users. There are no registration and driving licence requirements for these vehicles.

Improvement suggestions: Cong Nong standard designs are generally based on local investigations of available parts (engine, gear-box, transmission, frames, steering, axles, wheels etc.). It would be desirable to develop guidelines for the design of Cong Nong that set out basic quality, operator and general safety issues (e.g. weight/capacity: horsepower, maximum speed and braking requirements).

Government policy development: With consideration of the hitherto unregulated fabrication and use of the Cong Nong, and the rapid recent development of more modern, proven designs and standardization of trucks, the Government made an Instruction No 46/2004/CT-TTg, issued 9 December 2004: which instructed the cessation of Cong Nong manufacture after 31 December 2007: furthermore forbidding use of Cong Nong on the National and Main roads. Decree No 23/2004/ND-CP, issued 13 January 2004, also aimed to stop the use of 'over-age' cars, trucks, and buses (limit truck age – 25 years, limit bus age – 20 years, limit self made vehicle age -17 years).

These policies are an expected development in the fast changing transport sector in Vietnam. However there will probably be an impact on the transportation availability and costs for the rural poor.

Following the estimates of the Government of Vietnam, in 2004 there were about 120,000 Cong Nong in Vietnam, transporting 70% of goods in total for the rural areas and towns. If the cost of each Cong Nong is at least VND15 million (US\$950), the total value of the Cong Nong fleet in Vietnam is more than VND 1,800 billion (US\$114 million). This is a very substantial transportation asset predominantly used by poor people. It will be sensible to carefully phase out the use of this substantial investment and consider measures to possibly modify the equipment and ameliorate the affects on the rural poor.

When interviewed in the study provinces, the owners of Cong Nong workshops advised that they are ready to manufacture Cong Nong following any agreed standards, which would be issued by Ministry of Transport. In 1998, Da Nang Provincial Department of Transport (PDOT) representatives had researched "Improvement & Standardization of Cong Nong". The study outputs included 9 standard design options. Unfortunately, these outputs were not disseminated to other provinces and to a national level, and are not currently available.

In the face of the new restrictive legislation framework, there has been wide discussion in the media and at local government level. Representations have gained some relaxation and the delay of the restriction's introduction. However the Cong Nong manufacturers are having necessarily to turn their production skills to other equipment such as construction machinery.

It is interesting to note that in spite of the progression towards mass produced trucks, at present in some provinces, some people still rely on the use of cows or buffalos for their transportation and agricultural needs.



3. Conclusions

In Vietnam, the positive benefit of locally made, light vehicles (Cong Nong) has been identified as a means of providing low cost transportation for rural and poor communities. These vehicles are believed to have made a contribution to the remarkable success of the agricultural sector and national poverty reduction initiatives in recent years.

It is possible that other developing countries could benefit from the introduction of low cost locally assembled or fabricated light vehicles and reduced transport costs. It is appropriate that issues of regulation, licencing, fiscal environment, promotion, support, skills development, training and mentoring should be considered in a national context.

It is likely that an 'enabling' environment for such vehicles should encourage the fabrication and operation of these vehicles through for example, investment, tax and licencing incentives, whilst at the same time restricting usage on high speed routes and ensuring that operational safety issues are adequately accommodated.

The Government of Vietnam is taking steps to now restrict the use of these vehicles, as the rapid development in the country makes more advanced, mass production vehicles more widely available. These moves are generating vigorous local debate regarding impact on existing vehicle owners and the poor who have depended on these reasonably priced vehicles and their low cost of operation.

There is a strong argument for flexibility in the improved regulation of small scale manufacture of intermediate transport equipment and for continuing to benefit from the skills, ingenuity and cost base of local manufacturers to keep transport costs low, to the advantage of the rural and poor communities.

APPENDICES

APPENDIX 1

Summary: Characteristics of Typical Cong Nong/mini trucks in Vietnam

At present, there are 2 typical types of Cong Nong fabricated by small scale manufacturers: Lengthwise mounted engine Cong Nong, Transverse mounted engine Cong Nong. These are distinct from the modern and pick-up truck.



Lengthwise engine Cong Nong



Transverse engine Cong Nong



Pick-up truck

- Depending on the utilization purposes, the users can buy the Lengthwise mounted engine Cong Nong or Transverse mounted engine Cong Nong. Farmers usually like to use the Lengthwise engine Cong Nong, because they can use that vehicle for transportation, ploughing, raking, milling, water pumping, rice-husking, with attachments driven through the pulley and belt arrangements. Some users need only the transportation function; they tend to use the Transverse engine Cong Nong because of the greater carrying capacity (typically 2-3 Tonne). In Dong Thap province, they manufacture very large Transverse engine Cong Nong with a carrying capacity of 7 Tonnes. The cost of a typical Lengthwise mounted engine Cong Nong is from VND15 million to VND20million (US\$937 to US\$1,250). The cost of a Transverse mounted engine Cong Nong is about VND50 million (US\$ 3,125). The cost of the large Transverse engine Cong Nong in Dong Thap is VND130million (US\$8,125).
- Local manufacturers in provinces have used parts of secondhand buses or trucks (engine, gear-box, transmission, frames, steering wheel etc.). Especially, in some provinces in the South, old damaged trucks of the US Army (from the war period) have been used for Cong Nong manufacture. However some manufacturers have used new engines, new gear-boxes (from Vietnam or China), and new body frames fabricated from steel.



Chinese Diesel Engine



Vietnamese Diesel Engine

- Because of the use of old or recycled parts for Cong Nong (the age of these parts are not known) and due to safety concerns (speed differentials and licencing), the Vietnam Government decreed against Cong Nong manufacture from December 2007. Regarding usage of existing Cong Nong, some provinces forbid Cong Nong use only on national or main roads. The restrictions mean that at present, people are being encouraged to use the conventional pick-up trucks made in Vietnam or China. They are more expensive, for example: capacity 980kg - VND142million (US\$ 8,875), capacity 1.5Tonne - VND175 million (US\$ 10,937), capacity 2.5T- VND230 million (US\$ 14,375) etc.



Cong Nong transports people



Cong Nong transports rice



Cong Nong mills coffee

Specifications Summary of typical Cong Nong & pick-up in Vietnam
(Options are shown in **blue** text)

| No | Specifications | Lengthwise mounted engine Cong Nong | Transverse mounted engine Cong Nong | | Conventional Pick-up Truck |
|----|------------------------------------|---|--|---|---|
| | | | Normal | Large | |
| 1 | MODEL TYPE | Lengthwise engine Cong Nong | Transverse engine Cong Nong | Large Transverse engine Cong Nong | DAMCO Pick-up |
| | Photographs |  |  |  |  |
| 2 | RATED CARRYING CAPACITY (T) | 1 T | 3 T | 7 T (4.5T) | 1.25 T (2.5 T) |
| 3 | UNLADEN WEIGHT (T) | 0.8 T | 1.8 T | 3.5 T (2.5T) | 2.52 (2.68T) |
| 4 | ENGINE DETAILS | | | | |
| | Engine Manufacture: | Tran Hung Dao, Dong Phong (VN, China) | Vietnam, Chinese | Secondhand engines 354 (UK), Kia (South Korea). | NJ3040DBWZ (JZ5815CD) (China) |
| | Diesel engine of power output: | 15 horsepower | 24 horsepower | 100 horsepower (75 horsepower) | 58 kW (≈ 78hp) |
| | Number of cylinders: | 1 | 1 | 6 (4) | 4 |
| | Engine mounted | lengthwise - over front axle | Transverse - over front axle | Transverse - over front axle | Transverse - over front axles |
| 5 | FUEL | Diesel | Diesel | Diesel | Diesel |
| | Consumption: | 4 - 6 litres/ 100km | 6 litres/ 100km | 3 litres/ 1 hour (engine working) | 12 (14) litres/ 100km |

| | | | | | |
|----|--|---|---|---|--|
| | Fuel capacity: | 5 - 12 litres | 7 litres | 100 litres (60 litres) | 60 (60) litres |
| 6 | TRANSMISSION | Direct drive through clutch to transfer box to front axle (2WD) | Direct drive through clutch to transfer box to 2 axles (4WD) | Direct drive through clutch to transfer box to 2 axles (4WD) | Direct drive through clutch to transfer box to 2 axles (4WD) |
| 7 | GEAR-BOX (Tran Hung Dao factory - VN): | 4 speed manual. (3 forward speeds+1 backwards speed) | 4 speed manual. (3 forward speeds+1 backwards speed) | 4 speed manual. (3 forward speeds+1 backwards speed) | 6 speed manual (5 forward speeds+ 1 backwards speed) |
| 8 | TYRES | | | | |
| | Front axle | | | | |
| | Tyre code | 600-12 | 700-16 | 1100-20 (900-20) | 700-16 |
| | Diameter (mm) | 600 | 700 | 1100 (900) | 700 |
| | Width (cm) | 12 | 16 | 20 | 16 |
| | Rear axle | | | | |
| | Tyre code | 700-16 750-16 | 900-20 | 2 x 1100-20 (900-20) | 750-16 |
| | Diameter (mm) | 700 750 | 900 | 1100 (900) | 750 |
| | Width (cm) | 16 16 | 20 | 20 | 16 |
| 9 | BRAKES Parking and Motion (Front/Rear) | control by hand, mechanical/ control by foot, mechanical | control by hand, mechanical/ control by foot, mechanical | Control by hand, mechanical/ control by foot, hydraulic | control by hand, mechanical/ control by foot, mechanical & hydraulic |
| 10 | LIGHTS: | 1 front headlight, 0 rear light, 0 turn signal, 0 horn | 2 front headlights, 2 rear lights, 4 turn signals, 1 horn | 2 front headlights, 2 rear lights, 4 turn signals, 1 horn | 2 front headlights, 2 rear lights, 4 turn signals, 1 horn |
| 11 | SEATS | 1 | 2 | 2 | 2 + small bed (2) |
| 12 | BODY | | | | |
| | Dimensions | 1m wide x 2 m long x 0.5 m deep (1 m3) | 1.2m wide x 2.2 m long x 0.6 m deep (1.58m3) | 2.1m wide x 3.2 m long x 0.8 m deep (5.38m3) | 1.69 w x 3.1 l x 0.45 d metres : 2.36m3 (1.82 w x 3.35 l x 0.55 d : 3.35m3) |
| | Tipping facility | Manual | Hydraulic | Hydraulic | Hydraulic - auto |
| 13 | OVERALL VEHICLE | Width: 1.5 metres Length: 2.8 metres Height: 1.1 metres | Width: 1.7 metres Length: 2.8 metres Height: 1.8 metres | Width: 2.1 metres Length: 5.2 metres Height: 2.5 metres | Width: 1.8 metres Length: 5.765 metres Height: 2.4 metres (Width: 2.0 Length: 5.99 Height: 2.45 metres) |

| | | | | | |
|----|--|--|----------------------------|--|---|
| 14 | GROSS VEHICLE WEIGHT (Fully loaded) | 1.8 T | 4.8 T | 10.5T | 3.765 T (5.18 T) |
| 15 | MAXIMUM SPEED | Max 12-30kph approx unloaded | Max 70kph approx unloaded | Max 40kph approx unloaded | Max 85 (95) kph approx unloaded |
| | | Max 8-20kph approx loaded | Max 50kph approx loaded | Max 25kph approx loaded | Max 68 (75) kph approx loaded |
| 16 | PRICE NEW | VND 15 → 24 million (US\$937.5 →1,500) | VND 50 million (US\$3,125) | VND 130 million (US\$8,125) | VND 175 (230) million , US\$10,937 (US\$14,375) |
| 17 | MAINTENANCE | | | | |
| | Lubrication oil replacement ## : | every 4,000km (3 litres) | every 4,000km (3.5 litres) | every 4,000km (18 litres) | every 10,000km (11 (14) litres) |
| | Tyre replacement: | using secondhand tyres of cars, trucks | 40,000km | using secondhand tyres of cars, trucks | 50,000 km |
| | Front tyre new: | VND700,000 (US\$43.75) | VND1 million (US\$62.5) | | |
| | Rear tyre new: | VND 1 millions (US\$62.5) | VND 1.4 million (US\$87.5) | | |
| | Tyre secondhand | VND200,000(US\$12.5). | | | |
| 18 | OTHER FUNCTION OPTIONS | Water pump, rice-husking, plough, rake, milling though the pulley belt, Concrete mixer, lifting construction materials | None | None | None |
| 19 | ESTIMATED OPERATING COST PARAMENTERS | | | | |
| | Estimated Operating Life: | from 10 to 12 years | 12 years | 15 years | 25 years |
| | Estimated Depreciation (undiscounted & no finance costs) | US\$0.22/day – US\$0.43/day | US\$0.74/day | US\$1.55/day | US\$1.25/day – US\$1.64/day |

| | | | | | |
|----|---|---|--|---|--|
| | Typical kms per year: | 30km x 350 days = 10,500km | 10,000 km | N/A | 12,000km |
| | Replacement engine cost: | New: VND 4 million (US\$250) | New: VND 6 million (US\$375) | New: VND 75 million (US\$4,687) | VND 25 million (US\$1,562) |
| 20 | HIRE RATE | | | | |
| | Typical Hire Rate: | VND70,000/day (US\$4.375) | VND100,000/day (US\$6.25) | N/A | N/A |
| | Goods transportation (Depending on value of goods)* | (US\$0.31-0.70/tonne-km) | (US\$0.31-0.70/tonne-km) | 10,000VND/1km, 1T (US\$0.625/tonne-km) | No data |
| 21 | GENERAL COMMENTS | | | | |
| | Advantages | Lengthwise mounted engine Cong Nong flexibility & multi-function, cheap cost, transit even on the bad/ damaged/ narrow roads, turning circle diameter of 4 or 5m. Engine, Gear-box of VN/Chinese (cheap & available). | Cheap, transit on bad/ damaged/ narrow roads. | Long lasting, strong, quality is adequate for vehicle registration, the cost is a half that of new truck of Vietnam or China factories. | Standardised construction and spares. Guarantee for 10,000km or 1 year. |
| | Disadvantages | Noisy, non standard, pollution. | Noisier than other cars & trucks, pollution | Noisy, pollution | Expensive |
| | Improvement suggestions: | Addition of headlights, turn signals, horn. | Replacement by new modern, more efficient engine. | the body frame can be made from new steel | None |
| 22 | MANUFACTURER INFORMATION: | Manufacture 100 new lengthwise mounted engine Cong Nong per year with 6 worker team. | Manufacture 100 transverse mounted engine Cong Nong per year with 6 worker team. | Manufacture 100 new large transverse engine Cong Nong per year with 10 worker team. | Manufacture 40 new Damco pick-ups (and 50 buses) per year with 40 workers. |

NOTES

* Transportation rates assume that the operator will find a return load or travel back empty.

Typical Fuel Price: 14,200VND (US\$ 0.8875)/litre

Lubrication oil price: 26,000 VND (US\$1.625)/litre

The following Appendices provide details of examples of the locally made mini trucks manufactured in Vietnam. They are only a sample from what has been a substantial and varied market.

Appendices: Specifications of Cong Nong in 6 provinces in Vietnam

Appendix 2- Technical specifications of Cong Nong – Tuyen Quang Province



Lengthwise mounted engine Cong Nong

MANUFACTURER: Cong Tan Ha
Address: Village No 11, Y La commune, Tuyen Quang town
Telephone: 027821966, Mobile: 0914765194
e-mail: No **website (if available):** No

MODEL NAME: CONG TAN HA

RATED CARRYING CAPACITY: 1 tonne **Cong Nong unladen weight:** 0.8 Ton

ENGINE DETAILS:

Engine Manufacture: Tran Hung Dao (VN), Nam Tien (VN&Chinese), Chinese
 Diesel engine of power output: 15 horsepower
 Number of cylinders: 1
 Engine mounted lengthwise over front axle

FUEL:

Diesel
 Consumption: 4 litres/ 100km.
 Fuel Price per litre: 14,200VND (US\$ 0.8875)
 Fuel capacity: 9 litres

TRANSMISSION:

Direct drive through clutch to transfer box to front axle (2WD)
 Gear-box: 4 speed manual (3 forward speeds + 1 backwards speed)

| | | | |
|--------------|---------------------|-------------------|-------------------|
| TYRES | (Tyre code): | Front axle | Rear axle |
| | | Tyre code: 600-12 | Tyre code: 700-16 |
| | | Diameter: 60cm | Diameter: 70cm |
| | | Width: 12cm. | Width: 16cm |

BRAKES (Front/Rear): control by hand, mechanical/ control by foot, hydraulic

LIGHTS: 2 front headlights, 1 Rear light, 0 turn signal

SEATS: 1 (For driver).

BODY: Typical dimensions: 0.9m wide x 1.8 m long x 0.4 m deep (0.648m³)
Manual tipping facility

OVERALL VEHICLE

Width: 1.3 metres Length: 3.8 metres Height: 1.1 metre

GROSS VEHICLE WEIGHT (Fully loaded) 1.8 Tonne

MAXIMUM SPEED: Max 20 kph approx unloaded
 Max 10 kph approx loaded

PRICE NEW: VND 20 million new (US\$1,250)

MAINTENANCE:

Lubricate oil replacement: every 2,000km (3.5 litres)

Lubricate oil price per litre: 26,000 vnd (US\$1.625)

Tyre replacement: after about 2 years (about 18,000km)

OTHER FUNCTION OPTIONS:

- Water pump, rice-husking, plough, rake, milling.
- Lifting construction materials.

ESTIMATED OPERATING COST PARAMETERS:

Estimated Operating Life: from 10 to 12 years

Typical kms per year: 30km x 350 days = 10,500km

Replacement engine cost: VND 4 million (US\$250)

Engine service: VND200,000 to 300,000/ time (from US\$12.5 to 18.75/time)

HIRE RATE:

Typical Hire Rate: nobody hires the vehicle only. They hire for goods transportation with the rate 50,000VND/10km (US\$3.125/10km) (US\$0.31/tonne-km).

GENERAL COMMENTS:

- Advantages: Multi-function, no vehicles are better designed than lengthwise mounted engine Cong Nong concerning the aspects of cheap cost, task flexibility, able to transit even on the bad/ damaged/ narrow roads, turning circle radius of 4 or 5m.
- Disadvantages: Causing damage to earth roads when overloaded for transportation. No horn, light system is not complete.
- Improvement suggestions: addition of horn, turn signal and electric starter for Lengthwise mounted engine Cong Nong, (At present, electric starter can be fitted to customer's specific requirement).
- Manufacturer information: new manufacture of 40 No. vehicles per year with the team of 2 No. workers.

Appendix 3- Technical specifications of Cong Nong – Ninh Binh Province



Lengthwise mounted engine Cong Nong



Transverse mounted engine Cong Nong

MANUFACTURER: Hoang Son private Enterprise
 Address: Minh Khanh ward, Ninh Binh city.
 Telephone: 030890817, Mobile: 0913292350
 e-mail: No
 website (if available): No

MODEL NAME: CONG NONG

RATED CARRYING CAPACITY: 1T/3T (Lengthwise engine/Transverse engine)
 Cong Nong unladen weight: 1T/1.8T (Lengthwise engine/Transverse engine)

ENGINE DETAILS:

Engine Manufacture: Chinese
 Type: D15S1100/D24S1115 (Lengthwise engine/ Transverse engine)
 Diesel engine of power output: 15/24 horsepower (Lengthwise engine/
 Transverse engine)
 Number of cylinders: 1
 Engine mounted lengthwise/ Transverse over front axle

FUEL:

Diesel
 Consumption: 4 litres/ 100km – 6 litres/ 100km (Lengthwise/ Transverse)
 Fuel Price per litre: 14,200VND (US\$ 0.8875)
 Fuel capacity: 5/ 7 litres (Lengthwise/ Transverse)

TRANSMISSION:

Direct drive through clutch to transfer box to front/rear axle (2WD)
 (Lengthwise/ Transverse)
 Gear-box: 4 speed manual (3 forward speeds + 1 backwards speed)

TYRES (Tyre code):

Lengthwise engine

Front axle
 Tyre code: 600-12
 Diameter: 60cm
 Width: 12cm.

Rear axle
 Tyre code: 700-16
 Diameter: 70cm
 Width: 16cm

| | | |
|-------------------|-------------------|-------------------|
| Transverse engine | Front axle | Rear axle |
| | Tyre code: 700-16 | Tyre code: 900-20 |
| | Diameter: 70cm | Diameter: 90cm |
| | Width: 16cm. | Width: 20cm |

BRAKES (Front/Rear): control by hand, mechanical/ control by foot, mechanical

LIGHTS: Lengthwise/ Transverse: 1/ 2 front headlights, 2/2 Rear light, 0/1 turn signal

SEATS: Lengthwise/ Transverse:1/ 2.

BODY (Lengthwise/ Transverse):

Typical dimensions: 1.0m wide x 2 m long x 0.5 m deep/
1.2m wide x 2.2 m long x 0.6 m deep (0.648/ 1.32m3)
Manual/ Hydraulic tipping facility

OVERALL VEHICLE (Lengthwise/ Transverse):

Width: 1.5/1.7 metres Length: 2.8/2.8 metres Height:1.1/1.8 metre

GROSS VEHICLE WEIGHT (Fully loaded) (Lengthwise/ Transverse): 1.8/ 4.8 Tonne

MAXIMUM SPEED (Lengthwise/ Transverse):

Max 15/ 70 kph approx unloaded
Max 10/ 50 kph approx loaded

PRICE NEW: (Lengthwise/ Transverse):

VND 20/ 50 million new (US\$1,250/ 3,125)

MAINTENANCE (Lengthwise/ Transverse):

Lubricate oil replacement: every 2,000km (3/ 3.5 litres)
Lubricate oil price per litre: 26,000 vnd (US\$1.625)
Tyre replacement: after about 40,000km

OTHER FUNCTION OPTIONS:

Lengthwise mounted engine Cong Nong: Water pump, rice-husking, plough, rake, milling, lifting construction materials.

ESTIMATED OPERATING COST PARAMENTERS:

Estimated Operating Life: 10 years
Typical kms per year: 10,000km
Replacement engine cost (Lengthwise/ Transverse): VND 3.8/ 5.2 million
(US\$237/ 325).

HIRE RATE:

Typical Hire Rate: VND100,000/day (US\$6.25), large Cong Nong.
Goods transportation: 25,000VND for 4km (US\$0.39/ km)
or 8,000VND for 1km (US\$0.50/ km)
(US\$0.39-0.50/tonne-km).
(Based on the 1T capacity Cong Nong. Rates for the larger loads negotiable)

GENERAL COMMENTS:

- Advantages: Cheap, able to transit on bad/ damaged/ narrow roads, easy buy the spare parts (local made)
- Disadvantages: Lengthwise engine: no turn signal, 1 front headlight.

The frame structure is fabricated from frames of old cars (trucks).

Noisier than other cars, trucks, some pollution.

- Improvement suggestions: addition of horn, turn signals and electric starter for Lengthwise mounted engine Cong Nong, (At present, electric starter fitted only to customer's specific requirement).
- Manufacturer information: new manufacture of 30 No. lengthwise mounted engine Cong Nong per year.

Appendix 4- The technical specifications of Cong Nong – Nghe An Province



Lengthwise mounted engine Cong Nong



Transverse mounted engine Cong Nong
(also obtainable, however details not available)

MANUFACTURER: Hoang Van Ha

Address: 24 Tran Hung Dao, Vinh city, Nghe An province.

Telephone: 038353324, Mobile: 0983053963

e-mail: No

website (if available): No

MODEL NAME: Lengthwise mounted engine CONG NONG (details follow)

RATED CARRYING CAPACITY: 1 T Cong Nong unladen weight: 0.85 T

ENGINE DETAILS:

Engine Manufacture: Tran Hung Dao, Song Cong (VN).

Diesel engine of power output: 15 horsepower

Number of cylinders: 1

Engine mounted lengthwise over front axle

FUEL:

Diesel

Consumption: 4 litres/ 100km.

Fuel Price per litre: 14,200VND (US\$ 0.8875)

Fuel capacity: 7 litres

TRANSMISSION:

Direct drive through clutch to transfer box to front axle (2WD)

Gear-box (Tran Hung Dao factory – VN): 4 speed manual
(3 forward speeds + 1 backwards speed)

Starting by handle.

| | | | |
|--------------|---------------------|-------------------|-------------------|
| TYRES | (Tyre code): | Front axle | Rear axle |
| | | Tyre code: 600-12 | Tyre code: 750-16 |
| | | Diameter: 60cm | Diameter: 75cm |
| | | Width: 12cm. | Width: 16cm |

BRAKES (Front/Rear): control by hand, mechanical/ control by foot, mechanical

LIGHTS: 1 front headlight, 0 rear light, 0 turn signal, 0 horn

SEATS: 1 (For driver).

BODY: Typical dimensions: 0.9m wide x 1.8 m long x 0.4 m deep (0.648m³)
Manual tipping facility

OVERALL VEHICLE

Width: 0.96 metres Length: 2.12 metres Height: 1.2 metres
(with cab roof - height: 2m)

GROSS VEHICLE WEIGHT (Fully loaded) 1.85 Tonne

MAXIMUM SPEED:

Max 12 kph approx unloaded
Max 8 kph approx loaded

PRICE NEW:

VND 15 million - new (US\$937)

MAINTENANCE:

Lubricate oil replacement: every 4,000km (3 litres)
Lubricate oil price per litre: 26000 vnd (US\$1.625)
Tyre replacement: using secondhand tyres of cars, trucks:
Front tyre new: VND700,000 (US\$43.75), Rear tyre new: VND 1.4 million (US\$87.5) – secondhand VND200,000(US\$12.5).

OTHER FUNCTION OPTIONS:

- Water pump, rice-husking, plough, rake, milling though the pulley belt.
- Concrete mixer through the pulley belt, lifting construction materials.

ESTIMATED OPERATING COST PARAMENTERS:

Estimated Operating Life: from 10 to12 years
Typical kms per year: 30km x 350 days = 10,500km
Replacement engine cost: VND 6 million (US\$375), secondhand engine VND4 million (US\$ 250).

HIRE RATE:

Typical Hire Rate: VND70,000/day (US\$4.375)
Goods transportation (Depending on value of goods), for example with construction materials the rate is 11,250VND/tonne-km (US\$0.70/tonne-km).

GENERAL COMMENTS:

- Advantages: Multi-function, cheap, able to transit bad/ damaged/ narrow roads. Engine, Gear-box of Tran Hung Dao, Song Cong factories (VN): local made.
- Disadvantages: Noisy, pollution.
- Improvement suggestions: addition of headlights, turn signals, horn.
- Manufacturer information: new manufacture of 100 No. lengthwise engine Cong Nong per year with 6 No. worker team (1998-2003).

Appendix 5- Technical specifications of DAMCO pick-up – Da Nang province



Damco Pick-up truck

MANUFACTURER: Da Nang automobile mechanical and electrical equipment company (DAMCO)

Address: 149 Tran Phu, Hai Chau district, Da Nang city.

Telephone: 05113734401, Mobile: 0903511225 (Mr. Khanh)

e-mail: kinhdoanhdamco@gmail.com

website (if available): No

MODEL NAME: DAMCO (Options are shown in blue text)

RATED CARRYING CAPACITY:

1.25 T (2.5T) Cong Nong self weight: 2.515 (2.68) T
Small truck (medium truck)

ENGINE DETAILS:

Engine Manufacture: NJ3040DBWZ (JZ5815CD) (China).

Diesel engine of power output: 58 kw

Number of cylinders: 4

Engine mounted lengthwise over front axle.

FUEL:

Diesel

Consumption: 12 (14) litres/ 100km.

Fuel Price per litre: 13,900VND (US\$ 0.86875)

Fuel capacity: 60 (60) litres

TRANSMISSION:

Direct drive through clutch to transfer box to both axles (4WD)

Gear-box : 6 speed manual

(5 forward speeds+ 1 backwards speed)

TYRES

(Tyre code):

Front axle

Rear axle

Tyre code: 700-16

Tyre code: 750-16

Diameter: 70cm

Diameter: 75cm

Width: 16cm.

Width: 16cm

BRAKES (Front/Rear): control by hand, mechanical/ control by foot, mechanical & hydraulic

LIGHTS: 2 front headlights, 2 rear lights, 4 turn signal, 1 horn

SEATS: 2 and small bed (1.25T).

BODY:

Typical dimensions: 1.69m wide x 3.1 m long x 0.45 m deep
 (1.82m wide x 3.35 m long x 0.55 m deep)
 Auto tipping facility

OVERALL VEHICLE

Width: 1.8 metres Length: 5.765 metres Height: 2.4 metre
 (Width: 2.0 metres Length: 5.99 metres Height: 2.45 metre)

GROSS VEHICLE WEIGHT (Fully loaded) 3.78 (5.18) Tonne

MAXIMUM SPEED:

Max 85 kph approx unloaded (95)
 Max 68 kph approx loaded (75)

PRICE NEW:

VND 175 (230) million , US\$10,937 (US\$14,375)

MAINTENANCE:

Lubricate oil replacement: every 10,000km (11 (14) litres)
 Lubricate oil price per litre: 24,000 vnd (US\$1.5)
 Tyre replacement: 50,000km.

OTHER FUNCTION OPTIONS: None

ESTIMATED OPERATING COST PARAMENTERS:

Estimated Operating Life: from 25 years
 Typical kms per year: 30km x 350 days = 10,500km
 Replacement engine cost: VND 25 million (US\$1,562.5)

HIRE RATE:

Typical Hire Rate: N/A
 Goods transportation : N/A.

GENERAL COMMENTS:

- Advantages: Guarantee for 10,000km or 1 year.
- Disadvantages: Expensive.
- Improvement suggestions: None
- Manufacturer information: new manufacture 40 No. Damcos (and 50 No. buses) per year with 40 No. workers.

Appendix 6- Technical specifications of Cong Nong – Dak Lak Province



Lengthwise mounted engine Cong Nong

MANUFACTURER: Agriculture equipment “TAN HOA BINH”
 Address: 219 Tran Hung Dao, Buon Ho town, Dak Lak province.
 Telephone: 0500870868, Mobile: 0906542222 (Mr. Lam)
 e-mail: No
 website (if available): No

MODEL NAME: Tractor Handle bars (Chinese)

RATED CARRYING CAPACITY: 1 T Cong Nong unladen weight: 0.5 T

ENGINE DETAILS:

Engine Manufacture: Dong Phong, Cao Phong (China).
 Diesel engine of power output: 15 horsepower
 Number of cylinders: 1
 Engine mounted lengthwise over front axle

FUEL:

Diesel
 Consumption: 6 litres/ 100km. (1.4 litres/ working hour)
 Fuel Price per litre: 14,200VND (US\$ 0.8875)
 Fuel capacity: 12 litres

TRANSMISSION:

Direct drive through clutch to transfer box to front axle (2WD)
 Gear-box : 4 speed manual
 (3 forward speeds+ 1 backwards speed)

| | | | |
|--------------|---------------------|-------------------|-------------------|
| <u>TYRES</u> | <u>(Tyre code):</u> | Front axle | Rear axle |
| | | Tyre code: 600-12 | Tyre code: 700-15 |
| | | Diameter: 60cm | Diameter: 70cm |
| | | Width: 12cm. | Width: 15cm |

BRAKES (Front/Rear): control by hand, mechanical/ control by foot, mechanical

LIGHTS: 1 front headlights, 0 rear light, 0 turn signal, 0 horn

SEATS: 1 (For driver).

BODY: Typical dimensions: 0.9m wide x 1.8 m long x 0.4 m deep (0.648m³)
Manual tipping facility

OVERALL VEHICLE

Width: 1.0 metre Length: 2 metres Height: 0.5 metre

GROSS VEHICLE WEIGHT (Fully loaded) 1.5 Tonnes

MAXIMUM SPEED:

Max 25→30 kph approx unloaded

Max 15→20 kph approx loaded

PRICE NEW:

VND 22 → 24 million - new (US\$1,375 → US\$1,500)

MAINTENANCE:

Lubricate oil replacement: every 4,000km (3.5 litres)

Lubricate oil price per litre: 26,000 vnd (US\$1.625)

Tyre replacement: using secondhand tyres of cars, trucks:

OTHER FUNCTION OPTIONS:

Water pump, rice-husking, plough, rake, milling though the pulley belt.

ESTIMATED OPERATING COST PARAMENTERS:

Estimated Operating Life: from 10 to12 years

Typical kms per year: 30km x 350 days = 10,500km

Replacement engine cost: VND 5~6 million (US\$312.5 ~US\$375)

HIRE RATE:

Typical Hire Rate: N/A

Goods transportation : VND40,000~50,000/5km (US\$2.5~3.125/5km)

(US\$0.5-0.625/tonne-km).

GENERAL COMMENTS:

- Advantages: Multi-functions, good price, suitable with Dak Lak hilly terrain.
- Disvantages: Noisy, pollution. Needing more headlights, turn signals etc.. Considered safe if travelling at a speed under 25km/ hour.
- Improvement suggestions: addition of headlights, turn signals (Do not need a horn because of the loud engine sound).
- Manufacturer information: new manufacture of 40~50 No. Cong Nong per year with 3 No. workers.

Appendix 7- Technical specifications of Cai Tien (Cong Nong) – Dong Thap province



Large Transverse mounted engine Cong Nong (under repair)

MANUFACTURER: Tam Nong mechanical construction co-operative
 Address: Hamlet No4, Tram Chim Town, Dong Thap province.
 Telephone: 067827045, Mobile: 0913649945 (Mr. Mai Van Lap – manager)
 e-mail: No
 website (if available): No

MODEL NAME: CAI TIEN

RATED CARRYING CAPACITY: 7 T (4.5 T) Unladen weight: 3.5 T (2.5T)
 Large (medium)

ENGINE DETAILS:

Engine Manufacture: Secondhand engine - 354 (UK), Kia (South Korea).
 Diesel engine of power output: 100 (75) horsepower
 Number of cylinders: 6 (4)
 Engine mounted transverse over front axle

FUEL:

Diesel
 Consumption: 3 (2) litres/ 1hr working.
 Fuel Price per litre: 13,900VND (US\$ 0.8675)
 Fuel capacity: 100 (60) litres

TRANSMISSION:

Direct drive through clutch to transfer box to front & back axles (4WD)
 Gear-box: 4 speed manual
 (3 forward speeds + 1 backwards speed)

TYRES (Tyre code):

| | |
|-----------------------------|---|
| Front axle | Rear axle |
| Tyre code: 1100-20 (900-20) | Tyre code: 1100-20 (900-20) (Double tyre) |
| Diameter: 110cm (90cm) | Diameter: 110cm (90cm) |
| Width: 20cm. | Width: 20cm |

BRAKES (Front/Rear):

| | |
|-----------------------------|----------------------------|
| Front axle | Rear axle |
| control by hand, mechanical | control by foot, hydraulic |

LIGHTS: 2 front headlights, 2 rear headlight, 4 turn signal, 1 hornSEATS: 2BODY: Typical dimensions: 2.1m wide x 3.2 m long x 0.8 m deep (5.37m³)
(1.8m x 2.5m x 0.7 m)
Hydraulic tipping facilityOVERALL VEHICLEWidth: 2.1 metres Length: 5.2 metres Height: 2.5 metres
(1.9m x 2.3m x 4.5m)GROSS VEHICLE WEIGHT (Fully loaded) 10.5 Tonne (7 T)MAXIMUM SPEED:Max 40 kph approx unloaded (40)
Max 25 kph approx loaded (25)PRICE NEW:VND 130 million - new (US\$8,125)
(VND 100 million – US\$ 6,250)MAINTENANCE:Lubrication oil replacement: every 4,000km (18 litres) (12 l)
Lubrication oil price per litre: 26,000 vnd (US\$1.625)
Tyre replacement: using secondhand tyres of cars, trucks.OTHER FUNCTION OPTIONS: No.ESTIMATED OPERATING COST PARAMETERS:Estimated Operating Life: from 15 years
Typical kms per year: 30km x 350 days = 10,500km
Replacement engine cost: VND 75 million (US\$4,687.5) - new,
secondhand engine: VND15 million (US\$ 937).HIRE RATE:Typical Hire Rate: N/A.
Goods transportation: 10,000VND/1km, 1T (US\$0.625/km,1T)
(US\$0.625/tonne-km).GENERAL COMMENTS:

- Advantages: Long lasting, strong, quality is adequate for registration, the cost is half the cost of a new truck from Vietnam or China factories.
- Disadvantages: Noisy, pollution.
- Improvement suggestions: the body frame could be made from new steel
- Manufacturer information: new manufacture of 100 No. Cai Tien (Cong Nong) per year with 10 No. workers.