

RIGID PAVEMENT DESIGN WITH RECYCLED CONCRETE AGGREGATE FOR LOW VOLUME ROADS

This Thesis Submitted to the Department of Civil Engineering of the University of Moratuwa in Partial Fulfillment of the Requirement Towards the Degree of Master of Science

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DEDICATION

TO MY MOTHER AND FATHER

For their continuous dedication and encouragement for my advancement

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ABSTRACT

The aim of this project is to determine the strength characteristic of recycled aggregates that can be used as an alternative material for rigid pavement construction.

The main consideration of any pavement design is to provide structural alternatives that are feasible both technically and economically. This can be achieved by specifying pavement layer thickness with proper types of materials based on the extent traffic, environmental conditions and life cycle cost analysis.

Since traffic is regarded as the key design parameter, traffic analysis was done for seventeen provincial roads. That analysis was carried out to find vehicle composition, magnitude of the axle loads, axle configuration and frequency of load repetitions.

An experimental campaign was implemented in order to monitor the recycled aggregate properties before utilizing them as a rigid pavement construction material. Properties of recycled aggregate were determined in terms of (i) particle size distribution (ii) particle density (iii) porosity and absorption (IV) particle shape (v) strength and toughness.

Then the development of concrete mix design was done. In this study, various physical and mechanical properties of concretes were examined. The concrete properties were determined by doing the workability test, compressive test, flexural strength and modulus of elasticity test.

Then suitable thicknesses for provincial roads were proposed based on the traffic volume and the recycled aggregate concrete properties.

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CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

All countries are facing a challenge to handle a significant amount of Construction and Demolition (C&D) waste generated every year from local construction activities. Natural disasters such as earthquakes also produce large amounts of C&D waste. A good proportion of these C&D materials are broken concrete and rock pieces, which can be recycled as recycled aggregates and granular materials that can be reused in construction works. Out of this, a large proportion of potentially useful materials are disposed in landfills. Some of these materials are not biodegradable and often leads to waste disposal crisis and environmental pollution.

Carrying waste materials away from the site causes financial and environmental problems. Therefore people try to recycle the waste concretes as aggregate in order to prevent such problems. From a purely economic point of view, recycling of C&D waste is only attractive when the recycled product is competitive with natural resources in relation to cost and quantity. Recycled materials will be more competitive in regions where a shortage of both raw materials and land filling sites exist.

In recent years, the continued wholesale extraction and use of aggregates from natural resources has been questioned even at international level. This is mainly because of the depletion of quality primary aggregates and greater awareness of environmental protection.

COWAM (COnstruction WAste Management) project was initiated by the EU organization to promote recycling process in Sri Lanka and the use of recycled products as far as possible for sustainable development and to help to preserve the precious natural resources. The Galle Municipal council is planning to setup a crusher unit to break the C & D waste in Galle under the assistance of COWAM.

Even though this was initially planed to tsunami debris, in the long run, it will provide a solution to the problem of ever increasing demand for landfill sites within the Galle

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City. This increases the life cycle of these materials, thereby reducing the amount of waste dumping and natural resource extraction.

This project aims to highlight the fact that the recycling process is highly applicable to today's construction industry because the recycled materials can be used in value added applications to maximize economic and environmental benefits. Although there are many material-recycling schemes recommended, actual administering of C&D waste recycling is limited to a few types of solid wastes. When considering a recyclable material, three major areas need to be taken into account (Mindess et al., 2003):

- (I) Economy
- (II) Compatibility with other materials and
- (III) Material properties.

There are varieties of markets for C&D materials if they can be recycled into useful material for any application. It is the determination from local recyclers what materials they accept and whether they require them to be separated at the job site. Separation at the jobsite can increase the value of C&D materials. However, some recyclers don't accept mixed loads of materials if separation at the jobsite is not feasible. As a direct result of this, recycling industries in many part of the world converts low-value waste into secondary construction materials at presents such as a variety of aggregate grades and aggregate fines (dust). Often these materials are used for road constructions, backfill for retaining walls, low-grade concrete production, drainage and brickwork and block work for low-cost housing.

Although there is a wide range of application in other countries, construction waste has not been used as a construction material in Sri Lanka. This report focuses on use of construction and demolition waste as a road construction material.

In order to achieve this goal, focus has been placed on demolished material in the construction field. Investigations were carried out to explore the possibility of use of recycled aggregates in the production of concrete for rigid pavement construction in low volume roads.

1.2 OBJECTIVE

The main objective of this research is to investigate the possibility of using recycled aggregate for rigid pavements in low volume roads and to propose suitable pavement dimensions for low volume roads from prepared concrete mix proportion with recycled aggregate.

In this research replacement of natural aggregate in concrete is to be done in two ways.

- 1. Total replacement of coarse and fine with coarse and fine recycled aggregate
- 2. Replacement of only coarse aggregate with recycled aggregate

1.3 METHODOLOGY

To accomplish the objective of the research following methodology was adopted.

- 1. Literature survey on use of recycled aggregate in concrete
- 2. Traffic estimation of low volume roads
- 3. Experimental investigation of recycled concrete material (RCM) to determine;
 - i. Physical and mechanical properties of recycled aggregate
 - ii. Suitable mix proportion of concrete with recycled aggregate considering water reducing admixture to improve the properties of fresh and harden concrete and to compare the properties of normal aggregate concrete and recycled aggregate concrete
- 4. Design of rigid pavement for selected recycled aggregate mix proportions and traffic volume

1.4 SCOPE OF THE REPORT

This thesis is structured as follows

- Chapter 1 describes the background and the objective of the research.
- Chapter 2 provides a review of relevant literature of types of waste, waste composition in Sri Lanka and overview of recycling process, rigid pavement construction and limitation to use of RA (recycled aggregate) and RAC (recycled aggregate concrete). This chapter also discusses the previous investigations and testing done with recycled aggregate.
- Chapter 3 discusses the results of traffic analysis of low volume roads.
- Chapter 4 discuses the experimental investigation of recycled aggregate and analysis of all experimental results obtained from the testing procedures. i.e it includes the preliminary design and information on the recycled aggregate testing, sieve analysis, design of the concrete mix, improvement of concrete mixes using admixtures.
- Chapter 5 discuses the required concrete pavement thickness for provincial roads based on traffic analysis and RAC properties.
- Chapter 6 contains the conclusions of the research and recommendations for future work.

CHAPTER 2

LITREATURE REVIEW

2.1 DEFINITIONS OF CONSTRUCTION WASTE

Waste is simply defined as "any material by product of human and industrial activity that has no residual value" (Serpell and Alacon, 1998 cited Loosemore and Teo, 2001). However this is not true for the construction waste, since it has a residual value.

Construction waste is defined as "the byproducts generated and removed from construction, renovation and demolition work places or sites of building and civil engineering structures" (Hong Kong polytechnic's, 1993; Macdonald and Smithers, 1998).

According to Jayawardane's studies (1992) the amount of waste in most of the construction sites in Sri Lanka is beyond acceptable limits.

Generated solid wastes related construction are in the form of building debris, rubble, earth, concrete, steel, timber, and mixed site clearance materials, arising from various construction activities including land excavation or formation, civil and building construction, site clearance, roadwork, and building renovation.

The construction waste can be classified in to two types.

1. Process waste

Residues produced during manufacturing operations.

2. Demolition waste

The waste generated in dismantling of buildings or infrastructure and consists of high percentage of granular hard materials. The demolition waste can be biodegradable (subject to decomposition by micro-organisms: eg. wood) and non-biodegradable (eg. heavy metal) waste.

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While some of these wastes are recyclable and reusable, most of them are usually dumped in landfills. Wastes are often the mixtures of inert and organic materials. The inert wastes are normally used in public filling areas and site formation works and the remaining wastes that can be reused are used for recycling process.

In general, demolition waste at least doubles the content of construction related waste (Peng etal, 1997). Thus, the recovery, reuse and recycle of demolition waste are more daunting and appropriate than the process waste.

So the study only focuses on the demolition waste. Before utilizing them in to an application its composition was also studied.

2.2 WASTE COMPOSITION IN SRI LANKA

A study was conducted on actual demolition waste by source evaluation method to find the composition of waste (Patirana etal, 2007). In that study randomly selected demolition sites and sampling was done using $1m^3$ timber boxes. Figure 2.1 shows the waste quantification process.



Figure 2.1: Waste quantification process

The survey results shows that material like bricks, cabok, motar and mixed waste are available in large quantities. Composition of bricks, cabok, motar and mixed waste are 27.54%, 30.68%, 14.13% and 12.03% respectively. Among those waste, cabok and bricks can be used as backfilling material. Bricks also can be used for fine aggregate replacement in concrete. Figure 2.2 shows the composition of demolition waste in Sri Lanka.



Figure 2.2: Sri Lankan demolition waste composition

Other impurities such as glass, steel and timber are available in minor quantities. Only concrete material was focused in this study. Its availability is 7.60% from the total demolition waste. These materials have been used for road construction, retaining walls backfilling, low-grade concrete production and low-cost housing construction (drainage, brickwork and block work) in other countries. In this project it is focused to use recycled concrete in rigid pavement construction.

2.3 RECYCLED AGGREGATE CONCRETE APPLICATION

There are two types of pavements;

- 1. Flexible pavement
- 2. Rigid pavement

Flexible pavements are made out of asphalt. It generally consists of a relatively thin wearing surface of asphalt built over the base course and sub- base course. In contrast to flexible pavements, rigid pavements are made up of cement concrete and they may or may not have a base course between the concrete surface and subgrade.

2.3.1 Rigid Pavement Construction

Concrete pavements are considered as rigid pavement. Rigid pavement can be placed either on a sub-grade or a sub-base layer. If it is placed on sub-grade layer homogeneity of the sub grade is particularly important and avoiding hard and soft spots are a priority in sub-grade preparation to prevent the pavement distresses. For most types of sub-grade, a sub-base layer is essential. Sub-base beneath the concrete pavements is prepared basically for the following reasons; prevention of pumping, enhance the structural strength of the pavement, improve the uniformity of the support given to the slab. Figure 2.3 shows the typical cross section of rigid pavement.





Figure 2.3: Rigid pavement layout

In rigid pavement, main component is the concrete layer. Concrete is a manufactured product, essentially consisting of cement, aggregate, water and admixtures.

Traditionally aggregates have been readily available at economic prices and properties to suit all purposes. However, in recent years extraction and use of aggregates from natural resources has been questioned even at international level. This is mainly because of the depletion of quality primary aggregates and greater awareness of environmental protection. In light of this, the availability of natural resources to future generations has not been realized.

Crushing the waste material and using it as coarse aggregate in new concrete reduces waste and reduces the need for virgin aggregate. When considering the aggregate in concrete, it occupies 60 to 80 percent of the volume of concrete as an inert filler material. Although aggregate are most commonly known to be inert filler in concrete, the different properties of aggregate have a large impact on the strength, workability, durability and economy of concrete. The aggregate properties have direct impact on the strength; workability and durability of concrete are size gradation, shape and texture, moisture content, specific gravity and bulk unit weight etc. Therefore before replacing natural aggregate component with recycled aggregate component, recycled aggregate properties should be determined.

In besides to that, the failure modes of the concrete slab also should be considered before concrete made with recycled aggregate is introduced to rigid pavement. Rigid pavement can be failed by either pumping action or by fatigue.

There are two major types of pavement distress and failures.

(1.) Pumping Action



Figure 2.4: Pumping action failure of the slab

If the support condition is not drainable material, water can be accumulated underneath the slab. Then, wheel load is moving from one slab to the other approach slab goes up and down with respect to leaving slab. This mechanism will lead to push retain water up and down. As a result of this pumping action soil particle can be washed out. Therefore the support condition is one of important parameter in rigid pavement design.

(2.) Fatigue failure

Concrete slab will fail if the induced stress exceeds the fatigue limit of the concrete material. If the stress ratio (induced stress / flexural strength) limit to 0.5, unlimited number of repetition can be accommodated without failure.

$$Stress Ratio = \frac{Actual Generated Stress}{Modulus of Rufture}$$

0.50- unlimited number of repetition without failure

If a flexural strength of recycled aggregate concrete material is twice the generated stress it will never fail in fatigue.

However, optimum concrete properties requirement can be determined depending on the traffic condition of the road. Fresh concrete properties and hardened concrete properties should be determined from trial mixes to obtain an optimum concrete mix.

Fresh properties (Slump)

A good concrete must have workability in the fresh state and also sufficient strength. It also mentioned that there are four factors that can affect the workability. They are as below:

- 1. Consistency: The degree of consistency is depends on the nature of works and type of compaction.
- Water/cement Ratio or Water Control of a concrete: Water/cement ratio is the ratio of water in a mix to the weight of cement. The quality of water that required for a mix depends on the mix proportions, types and grading of aggregate.
- 3. Grading of Aggregate: The smooth and rounded aggregate will produce a more workable concrete than the sharp angular aggregate.
- 4. Cement Content: The greater workability can be obtained with the higher cement content.

Compressive strength

Compressive strength of concrete can be defined as the measured maximum resistance of a concrete to axial loading. Compressive strength tests on standard 150mm concrete cubes were carried out at age's 7days, 14 days and 28 days.

Elastic Modulus

Modulus of elasticity of concrete is a very important property to determine the deflection of the structural elements. Elastic modulus of concrete is an indication of concrete stiffness. It varies depending on the coarse aggregate type used in the concrete.

The concrete's modulus of elasticity is deeply related to the stiffness of the coarse aggregates, the stiffness of the mortar, their porosity and bond. Therefore, for small replacement aggregate fraction will not significantly influence the overall stiffness because the mortar stiffness is also one of several factors for stiffness loss. But total replacement of the mortar will influence significant stiffness loss of modulus of elasticity of concrete.

Flexural Strength

Flexural strength of concrete is a main parameter in rigid pavement design. The reduction in flexural strength of recycled aggregate concrete would be attributed to the weaker bond among different components of the concrete matrix owing to the cement paste on the surface of recycled aggregate.

2.4 LITERATURE REVIEW OF RECYCLED AGGREGATE CONCRETE

Before using recycled aggregate as an alternative material for production of concrete, the embedded material such as reinforcement should be removed. It is carried out in the recycling process. This section discusses the recycling process and literature review recycled aggregate concrete properties.

Selective demolition and on-site sorting should be adopted for all demolition projects to facilitate recycling as far as possible.

2.4.1 Reviews on Recycled Process

Recycling of material is done by recycling plant. They are normally located in the suburbs of cities due to the noise pollution that make by the equipments that used during recycling process. According to Aggregate and Quarry, all the machinery used has to fit with the effective mufflers to reduce the noise from the processing activity. The recycled process consists of several steps to produce a good quality recycled aggregate material. The steps are given below.

Breaking of the Sources of Recycled Aggregate

Sources of recycled aggregate are mainly from the crushing of Portland concrete pavement and structures building. The equipments that used during recycling process are varying from the site conditions and also country to country.

The equipments used for crushing the Portland cement pavement & structural buildings are given below:

The equipments used for crushing Portland cement Pavement

Diesel pile – driving hammer
It is mounting on a motor grader that sticks in the Portland cement pavement
on around 30cm grid pattern.

Rhino - horn - tooth - ripper - equipped hydraulic excavator
It is used to remove all the steel reinforcement that remaining in the Portland cement pavement.

Hong Kong Building Department had been used the following methods to crush the structural building.

 Mechanical by hydraulic crusher with long boom arm The crusher with the long boom arm system breaks the concrete and steel reinforcements. This method is suitable for the dangerous buildings.

2. Wrecking ball

The building is demolished by the impact energy of the wrecking ball, which suspended from the crawler crane.

3. Implosion

A design included pre-weakening of the structure; the placement of the explosives and the building collapse in a safe manner has to develop.

Transportation

After the structural buildings and Portland cement pavements are demolished, the concrete debris has to send to the recycling plants for processing. Construction and Demolition Waste Recycling Information mentioned that it is good to use the roll – off containers or large dump body trailers to transport the mixed load of construction and demolition debris. This is the most effective and cost effective means of the transportation. It also mentioned that the construction and demolition debris could be transport by the closed box trailers and covered containers.

Crushing Plant

Crushing is the initial process of producing the construction and demolition debris into recycled aggregate. The concrete debris is crushed into pieces in this process. Aggregate and Quarry (2001) stated that generally the equipments used for crushing process are either jaw or impacted mill crushers. It also stated that all the recycling crushers have a special protection for conveyor belts to prevent damage by the reinforcement steel that in the concrete debris. They are fitted with the magnetic conveyors to remove all the scrap metal.

According to Recycling of Portland_Cement Concrete, the equipments used to crush and size the existing concrete have to include the jaw and cone crushers. The concrete debris will break down to around 3 inches by the primary jaw crusher. It also mentioned that the secondary cone crushers will breaks the materials to the maximum size required which vary between ³/₄ and 2 inches.

During the crushing process, all the reinforcing steels have to remove away. Professor S. L Bakoss and Dr R Sri Ravindarajah (1999) stated that there are three methods of sorting and cleaning the recycled aggregate, which are electromagnetic separation, dry separation and wet separation. Electromagnetic separation process is removal of reinforcing steel by the magnet that fitted across the conveyor belt in the primary and secondary crushers.

Dry separation process is removing the lighter particles from the heavier stony materials by bowing air. This method always causes lot of dust. Wet separation process is the aquamator, which the low-density contaminants are removed by the water jets and float – sink tank, and this will produces very clean aggregate.

According to COST 337 Unbound Granular Materials for Road Pavements, the wood pieces that contained in the concrete debris can be removed by hand – picking from a special platform over the discharge conveyor.

After finish the crushing process, the materials are then sent to the screening plant.

Screening Plant and Washing Plant

Screening is the process that separates the various sizes of recycled aggregate. The screening plant is made of a series of large sieves separates the materials into the size required.

Recycling of Portland Cement Concrete stated that the size of screen that used to separate the coarse recycled concrete aggregate and fine recycled aggregate is 3/8 inch. The size of screen used to separate the coarse recycled aggregate can be under or over 3/4 inches. It also stated that one more screen should be used to separate those particles that more than the specified size. After the screening process, the recycled are then sent to the washing plant. COST 337 Unbound Granular Materials for Road Pavements stated that the recycled aggregate that produced have to be very clean when using in the high quality product situation.

Stockpile

After finishing the recycling process, recycled aggregate are stored in the stockpile and ready to use. All the recycled aggregate is stored according to the different size of aggregate. According to Recycling of Portland_Cement Concrete, the stockpile has to prevent from the contamination of foreign materials. It also mentioned that the vehicles used for stockpiling have to be kept clean of foreign materials.



Figure 2.5: Recycling Portland cement Concrete flow chart

2.4.2 Barriers in Promoting Use of RA and RAC

Acceptability of recycled material is hampered due to a poor image associated with recycling activity, and lack of confidence in a finished product made from recycled material. Cost of disposal of waste from construction industry to landfill has a direct bearing on recycling operations. Low dumping costs in developing countries also act as a barrier to recycling activities. Imposition of charge on sanitary landfill can induce builders and owners to divert the waste for recycling. Some of these issues act as barriers in promoting more widespread use of recycled aggregate and concrete made with recycled aggregate.

Lack of Appropriately Located Recycling Facilities

Construction and demolition waste is generated in small quantities at locations, which could be widely separated. Therefore, portable equipment is needed, which can be used and set up close to demolition site. Transporting waste over large distances makes the proposition of using C & D waste uneconomical. Lack of such plants is a major barrier for 'Newcomers' in the field of C & D waste management. Commissioning of appropriately located recycling crusher units in a pilot plant can help in lowering barriers against recycling of C & D waste.

Absence of Appropriate Technology

There are very few commercially viable technologies for recycling construction and demolition wastes, and methods that can be used to crush C & D waste on a commercial scale are urgently required. In fact, when the technology is established, other issues such as quality control of raw material and finished product, etc. can be taken up.

Lack of Awareness

Lack of awareness towards recycling possibilities and environment implication of using only fresh mined aggregates are the main barriers due to which C & D waste is disposed only in landfills. Creating awareness of dissemination of information relating to the above barriers and the properties of concrete made with recycled aggregate essential to mobilize public opinion and instill confidence in favor of the recycling option. There is a need to create a market for recycled products by involving the construction industry and encouraging them to use recycled material in projects.

Lack of Government Support

A lack of government support and commitment towards development of recycling industry is often seen. Developing appropriate policy supported by proper regulatory framework can provide necessary impetus. It will also help in data compilation, documentation and control over disposal of waste material.

Lack of Proper Standards

Apart from the specification of RILEM, 1994 (RILEM - International Union of Laboratories and Experts in Construction Materials, Systems and Structures), JIS (Juggling Information Service) and those used in Hong Kong, only very limited codal specifications/standards regarding use of recycled aggregates are available. In fact, use of concrete with 100% recycled coarse aggregate for lower grade applications is allowed in Hong Kong, though for higher grade applications (above M35 concrete), only 20% replacement is allowed, and the concrete can be used for general applications, expect in water retaining structures. In Japan, JIS has drafted a Technical Report, TRA (Trades Recognition Australia) 0006 "Recycled Concrete Using Recycled Aggregate" to promote the use of concrete made with recycled aggregate. Development of relevant standards for recycled materials would provide producers with targets and users an assurance of quality of material. Standards formulated in the above mentioned countries could be guideline for development of specifications. Following section describes the recycled aggregate as an alternative material for

natural aggregate in concrete with that limitation.

2.4.3 Recycled Aggregate as an Alternative Material for Natural Aggregate in Concrete

In fact, the use of the recycled aggregate has been extensively studied and gaining the wider acceptance in the world. There are many testing based on the recycled aggregate have been carried out all around the world.

Some research results have indicated that not only recycled concrete material but also the coarse brick and tile aggregate, which are also commonly found in the demolition waste stream, can be used as a substitute of coarse natural aggregate in the production of concrete (Khalaf and De Venny, 2004; Kahaloo, 1995). Dhir et al., 1999, Poon et al., 2002 found that the recycled concrete aggregate (RCA) can be used in concrete and in the production of masonry blocks and bricks.

Hanson and Torben (1986) stated that since 1945, the research on recycled aggregate had been carried out in many countries. Limbachiya and Leelawat (2000) found that recycled concrete aggregate had 7% to 9% lower relative density and two times higher water absorption than natural aggregate.

Sagoe, Brown and Taylor (2002) stated that the difference between the characteristic of fresh and hardened recycled aggregate concrete and natural aggregate concrete is relatively narrower than reported for laboratory crush recycled aggregate concrete mixes. There was no difference at the 5% significance level in concrete compressive and tensile strength of recycled concrete and control normal concrete made from natural aggregate.

In the same year, poon (2002) reported that there were not much effect on the compressive strength of brick specimens with the replacement of 25% and 50% of recycled aggregate. But when the percentage of recycled aggregate replacement increased, the compressive strength of the specimens was reducing.

Mandal, Chakarborty and Gupta (2002) also found that there will no effects on the concrete strength with the replacement of 30% of recycled aggregate. But the compressive strength was gradually decreasing when the amount replacement of recycled increased. They concluded that the properties and the strength characteristic of recycled aggregate concrete were deficiency when compared to the specimens that

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made by the natural aggregate. Limbachiya (2003) found that there is no effect by using up to 30% of coarse recycled concrete aggregate on the standard 100mm concrete cube compressive strength. But when the percentage of recycled concrete aggregate used increased, the compressive strength was reducing.

In 1977, Frondistou-Yannas evaluated and compared the mechanical properties of conventional concrete and containing pieces of concrete from demolition waste in the place of natural coarse aggregate. He found that recycled concrete is enriched in gravel at the expense of mortar. The recycled aggregate concrete has a compressive strength of at least 76% and modulus of elasticity from 60% to 100% of the control mix. With replacement percentage of RCA increases gradual reduction in strength is occurs. Up to 30% of replacement of RCA content has no effect on concrete strength but thereafter a gradual reduction in strength occurs with increasing the RCA amount when comparison to the control mix. In beside to the strength characteristics tensile strength and modulus of elasticity is gradually decreasing as the percentage of recycled aggregate used in the specimens increased.

The porosity of recycled concrete made with substitution of recycled concrete aggregate was studied by Gomez-Soberon. The results showed that porosity increases when natural aggregate is replaced by recycled concrete aggregate. The increase in porosity is accompanied by a reduction in compressive strength as well as in modulus of elasticity.

According to Tavakoli (1996), the strength characteristics of recycled aggregate concrete were influenced by the strength of the original concrete, the ratio of coarse aggregate to fine aggregate in the original concrete, and the ratio of top size of the aggregate in the original concrete in the recycled aggregate. He also mentioned that water absorption and Los Angeles abrasion loss would influence the water cement ratio and top size ratio for the strength characteristic of recycled aggregate. Bodin and Zaharieva (2002) stated that decreasing of the strength of recycled concrete specimen was due to the increase of water/cement ratio that required by the preservation of workability.

Sawamoto and Takehino (2000) found that the strength of the recycled aggregate concrete can be increased by using Pozzolanic material that can absorb the water.

Mandal (2002) stated that adjusted the water/cement ratio when using recycled concrete aggregate during the concrete mixing can be improved the strength of the recycled aggregate concrete specimens. From the obtained result, recycled aggregate concrete specimens had the same engineering and durability performance when compared to the concrete specimens made by natural aggregate within 28days design strength.

Chen and Kuan (2003) found that the strength of the concrete specimens was affected by the unwashed recycled aggregate in the concrete. The effect will more strange at the low water cement ratio. These effects can be improved by using the washed recycled aggregate.

Another improving method is using the fly ash in the recycled aggregate mixing. Mandal (2002) stated that application of fly ash in the recycled concrete aggregate had improved the durability of the recycled aggregate concrete. Poon (2002) also mentioned that the use of fly ash could improve the strength characteristic of recycled aggregate. He stated that the compressive strength of concrete paving blocks was reached 49MPa at 28days by using fly ash. Berry and Malhotra (1980) stated that for high strength concrete, fly ash functions by providing increased strength at late ages of curing (56 to 91 days) that cannot be achieved through the use of additional Portland cement.

Some precautions must be taken while using recycled aggregate in the concrete mixing. According to Bodin and Zaharieva, the precautions must be taken was because of there were some pathological reactions such as alkali – aggregate reaction and sulphate reaction may be include in the performed characterization of industrially produced recycled aggregate. They also mentioned that the mix proportioning of recycled aggregate concrete must be suited when both fine and coarse recycled aggregate were substituted for natural aggregate.

Based on the experimental result, they developed some specification regarding recycled concrete aggregate. In the current specifications, it is allowed to use 100% coarse recycled aggregate in proportioning low-grade concrete (grade 20). In high grade concrete (i.e. grade 25-35), only 20% coarse portion of recycled aggregate

content is permitted. The fine portion (< 5mm), together with the coarse portion of recycled aggregate, is usually prohibited in proportioning concrete mixtures, as it is very difficult to control the workability and dimensional stability of the concrete mixtures.

In addition to RILEM (International Union of Laboratories and Experts in Construction Materials, Systems and Structures) committee recommends a design procedure for use of recycled aggregate (RA) in production of concrete based on experimental works.

Given recommendations of RILEM committee for proportioning of RCA (recycled concrete aggregate) is

- When designing a concrete mix using recycled aggregate of variable quality, a higher standard deviation should be employed in order to determine a target mean strength.
- When coarse recycled aggregate is used with natural sand, it may be assumed at the design stage, that the free W/C ratio required for a certain compressive strength will be the same for RAC as for conventional concrete.
- For a recycled aggregate mix to achieve the same slump, the free water content will be approximately 5% more than for conventional concrete.
- Trial mixes are mandatory and appropriate adjustments depending upon the source and properties of the RA should be made to obtain the required workability, suitable W/C ratio, and required strength of RAC.

According to experimental campaign, recycled aggregates can be used as an alternative material in concrete for natural aggregate in the world due to its higher strength characteristic. Nevertheless, it is questioned whether demolished recycled aggregate from structures can be used in concrete production in Sri Lanka. This research is carried out for examining the performance of Portland-cement concrete

produced with coarse recycled aggregates. The effects of up to 100% coarse recycled concrete aggregate in replacement of natural aggregate was assessed to check its suitability for use in a rigid pavement construction.



CHAPTER 3

TRAFFIC ESTIMATION OF LOW VOLUME ROADS

It is well known that pavement design and its performance are influenced by the traffic loading on the pavement. Traffic is regarded as the key parameter in road deterioration. It is therefore essential to know its composition in terms of:

- Total traffic volume (AADT)
- Magnitude of axle loads
- Frequency of load repetitions

The vehicles in roads can be categorized in two types i.e. light vehicles and heavy vehicles. AADT value is mainly attributed due to both types of vehicles. Seventeen "C class" roads were selected to get an idea about the traffic behavior of provincial roads (Appendix – A).

Axle load of light good vehicle has a negligible effect on pavement compared with the heavy good vehicle. Heavy vehicle wheel load, tire pressure and frequency together with environmental factors are all important to the performance of the pavements. However, the most significant parameter is the axle load since the damage to a road structure depends greatly on the magnitude of the axle loads. The damage to a pavement will result in pavement failure and increases very rapidly with increasing axle loads.

Accurate traffic estimation is essential for road pavement design and maintenance. Hence, Axle Load Surveys are essential in planning and the design phases of roads. Axle loads surveys are conducted rarely and only limited data available for provincial roads in Sri Lanka. Axle load survey data of five provincial roads were selected for determining the axle load. The selected roads are given below

- 1. Panawala Maniyangana Rd
- 2. Chillaw Iranawila Nainamadama Rd
- 3. Bathuluoya Dewalahandiya Rd
- 4. Udupila (Delgoda) of Kirillawala Udupila Rd
- 5. Neluwa-Kadihingala- Dellawa- Morawaka Rd

3.1 TRAFFIC ANALYSIS

3.1.1 Traffic Distribution of Provincial Roads

The vehicle composition of seventeen (17) Southern Provincial "C' class roads were expressed as a percentile value (%) from the AADT value as shown in Table 3.1. For estimation of lower and upper limit, "t" distribution (two tail methods) with 90% of confidence level was used.

Vehicle Type	Average Value	Standard Deviation	% Value from AADT	
	(%)		Lower	Upper
			Limit	Limit
Motor Cycles	39.89	8.05	35	44
Three Wheel	26.66	6.37	23	30
Car	4.23	3.08	2	6
Passenger Van	1.73	2.72	0	3
Light Goods Vehicle	6.22	2.95	4	8
Medium Goods Vehicle	7.02	6.36	3	10
Heavy Goods Vehicle	5.18	3.82	3	7
Medium Bus	4.68	4.39	2	7
Large Bus	1.98	1.76	1	3
Tractor/ Trail	2.38	2.86	0	4

Table 3.1 Vehicle composition as a % from the AADT

In the traffic analysis the author has found that the percentage of heavy good vehicles is lesser than the mid good vehicles and large buses.

Axle load distribution was further analyzed. Axle load distribution of vehicles was analyzed based on the 6-hour axle load survey data of five provincial roads. Cumulative percentile value of each vehicles category was plot against axle load group. When selection the axle load group, measured axle load were round off. Example for the round off is given below. Axle load of 54 kN (5.4 tons) in 50kN (5 tons) group while the 55 kN (5.5 tons) in group 60 kN (6 tons). Cumulative no. of vehicles and their cumulative percentile value of Panawala Maniyangana road are given in Table 3.2.

Axle Load Tons	Axle Load kN	Cum. Medium Buses	Cum. Pre	Cum. Large Buses	Cum. Pre	Cum. LGV	Cum. Pre	Cum. MGV	Cum. Pre	Cum. HGV	Cum. Pre	Cum. Farm Vehicle	Cum. Pre
1	9.96	4	100.00	76	100.00	40	100.00	30	100.00	9	100.00	18	100.00
2	19.9	4	100.00	75	98.68	1	2.50	13	43.33	8	88.89	10	55.56
3	29.9	1	25.00	64	84.21			5	16.67	3	33.33	3	16.67
4	39.8			32	42.11			3	10.00				
5	49.8			18	23.68			2	6.67		2788		
6	59.8			9	11.84								
7	69.7												
8	79.7							1	3.33				

Table 3.2 Axle Load Distribution of Panawala Maniyangana Road

The graphical representation of axle load distribution of Panawala Maniyangana road is shown in Figure 3.1.



Figure 3.1: Axle Distribution of Panawala - Maniyangana Rd

Figure 3.2 to 3.5 show the axle load distribution of vehicle types for the other selected roads.






Figure 3.3: Axle Distribution of Bathuluoya - Dewalahandiya Rd



Figure 3.4: Axle Distribution of Udupila (Delgoda) of Kirillawala - Udupila Rd





When increasing the axle load value, frequency of the load repetition is lower according to the above figures.

When considering frequency of load repetitions and the magnitude of the axle load values, mid good vehicles is the considerable vehicle type in Sri Lankan low volume roads. Figure 3.6 and Figure 3.7 describe the axle load distribution of large buses and medium good vehicles for the above roads.









In that analyzing, axle load values vary from 30 kN to 80 kN (3 to 8 tons) (wheel load was varied 15 kN to 40 kN).

The damage to a pavement will increases very rapidly with increasing axle loads. The damaging effect of each type of vehicle can be determined by analyzing the ESA variation of each type of vehicles. The damaging effect of vehicle can be determined relative to a standard axle load (80kN).

Table 3.3 shows the lower and upper limit of ESA value for each of vehicle categories. In that calculation author used the "t" distribution (two tail method) with 90% confidence level. Corresponding axle load for the upper ESA value was entered to the maximum axle load value column in Table 3.3.

V ehicle Type	Average ESA	Standard Deviation	ESA variation	Maximum Axle Load (kN)
Medium Bus	0.0076	0.00655	0.00123 - 0.01396	31
Large Bus	0.0689	0.06656	0.00418 - 0.13354	51
Light Goods Vehicle	0.00059	0.00068	0.00010 - 0.00125	18
Medium Goods Vehicle (<8.5 T)	0.03216	0.01626	0.01636 - 0.04797	41
Large Lorries (>8.5 T)	0.06386	0.07697	0.02021 - 0.13866	52
Farm V ehicles	0.00242	0.00379	0.00010 -0 .00610	25

Table 3.3 ESA variation of each vehicle categories

Table 3.4 gives the average ESA value and no.of vehicles as a percentage from ADT for the Class A, B roads.

		Weyang	oda -	Avissawe	illa -	Pelmadu	ılla-		
ROAD NAME :		Ruwanwella (B445)		Hatton - N'Eliya Rd (A007)		Nonagama (A018)		Horana (B084)	
LOC	CATION :	Gonagal -2008	ldeniya	Thalduwa -2009		Embilipitiya - 2008		Kahathuduwa- 2009	
	VEHICLE TYPE	AVG. ESA	MCC %	AVG. ESA	MCC %	AVG. ESA	MCC %	AVG. ESA	MCC %
1	Motor Cycle		41.33		24.99		28.78	11 4 3 4 3 5 3	43.95
2	Three Wheel		29.68		22.12		11.29		13.36
3	Car		4.86		15.16		13.76		12.3
4	Van		6.40		10.05		6.66		9.16
5	Medium Bus	0.0060	2.00	0.0383	1.69	0.0067	0.82	0.0061	1.74
6	Large Bus	0.1044	3.39	0.8395	9.78	0.3397	8.36	0.1345	4.88
7	Light Goods Vehicle	0.0028	2.08	0.0029	4.24	0.0052	8.19	0.0015	4.01
8	Medium Goods Vehicle (< 8 .5 T)	0.0479	7.17	0.1457	7.20	0.0570	14.72	0.1581	5.11
9	Large Lorries (>8.5 T)	0.8029	2.54	3.3635	4.32	8.4647	5.18	4.7109	4.99
10	Three Axles Vehicle Combined			11.9258	0.20	2.8501	0.66	1.7476	0.29
11	Three Axles Vehicle Articulated						0.00		
12	Four Axles Vehicle Articulated			17.3004	0.07	4.4804	0.63	0.2346	0.12
13	Five Axles Vehicle Articulated			22.8424	0.01		0.03	0.1000	0.04
14	Six Axles Vehicle Articulated						0.03		
15	Farm Vehicles		0.54		0.15	0.0001	0.90	0.0042	0.06
	ADT		1560		10351		4014		6223

Table 3.4 ESA variation of each vehicle categories in Class A-B roads

There is significance impact due to heavy good vehicles in Class A, B roads since the ESA values of Class A, B roads are higher than ESA value of low volume roads. The damaging effect to the pavement will due to large lorries, three axles vehicle combined and four axles vehicle combined in Class A, B roads. When compared to low volume roads the damaging effect due to only medium good vehicles. So, the damaging effects are high in Class A, B roads relative to low volume roads.

CHAPTER 4 EXPERIMENTAL INVESTIGATIONS

4.1 DETERMINATION OF RECYCLED MATERIAL PROPERTIES

While recycled aggregate is handled similarly to new aggregate, some differences between new and recycled aggregate must be addressed. The tests and specifications, which are applicable for conventional materials, may be inappropriate for evaluation of non-conventional materials, such as industrial wastes. This is because the material properties, for example, particle sizes, grading and chemical structure, may differ substantially from those of the conventional materials. Thus for an appropriate assessment of these materials, new tests are to be devised and new acceptability criteria are to be formed. However, with the advent of performance-based tests, it is expected that the performances of the conventional as well as new materials can be tested on a same set-up and be compared.

Laboratory cast concrete was used as the source of recycled concrete aggregates for the study. Recycling aggregate involves breaking old concrete, removing the reinforcement and crushing the resulting material to a specified size and gradation. Samples used for test were produced in single size fraction (5-20mm) using commercial plant comprising primary jaw and secondary cone crushers and screens.

Recycled aggregate properties were determined in terms of grading, density, water absorption and aggregate impact value test.

4.1.1Gradation of Recycled Aggregate

Grading refers to the distribution of particle size present in aggregates. The grading plays a significant role in influencing concrete properties, including drying shrinkage, workability of concrete and also the production cost. Almost any gradation can be achieved with recycled aggregate. Crushing may leave some residual dust on the aggregate surfaces.

Coarse and fine aggregate are generally sieved separately. Crushing process produces both the coarse and fine fraction. Therefore the overall gradation was also checked. Test was carried out according to the BS standard. Table 4.1 shows sieve analysis test result of RCM. Figure 4.1 shows the gradation curve with specified limits.

Sieve		BSI	Limit
size	% of		
(mm)	Passing	Min	Max
37.5	100	100	100
28	99.2	96	100
20	93.6		
14	76.8		
10	64.4		
6.3	45.7		
5	38.8	35	55
3.35	31.7		
2.38	27.3		
1.8	24.5		
1.18	18.9		
0.6	11.8	10	35
0.425	9.7		
0.3	7.8		
0.15	4.6	0	10

Table 4.1: Sieve analysis test result for RCM (Overall Gradation)



Figure 4.1 Sieve analysis test result of RCM (Overall Gradation)

From test result it was found that coarse fraction and fine fraction is about 68% & 32% of total aggregate content respectively. Therefore, both coarse and fine fraction can be replaced from recycled concrete material. But due to the higher absorption value of fine material the workability of the mix will be less. Since it is also intended to replace only the coarse fraction with recycled material, the gradation of fine and coarse aggregate was checked separately. The grading curves of coarse and fine aggregate are shown in Figure 4.2 and 4.3 respectively.

Grading for Recycled Coarse Aggregate

Nominal maximum size of recycled aggregates is 20 mm. Particle size distribution test result and the specification limits shown in Table 4.2. The grading curve of recycled aggregate is within the limit of 20mm single sized aggregate.

Table 4.2:	Sieve anal	ysis test	result for	RCM (Coarse	Fraction)
		/		•		/

RCM- Sieve Analysis Results											
Sieve Size	Sieve Size Retained X Retained % X(Ret:) %Passing BS 882										
(1) 20mm		La	sb		= Gra	ded	Sing	e sized			
37.5					100		100				
25	28 2	28.2	1.124492	98.88							
20	219.2	247.4	9.865221	90.13	90	100	85	100			
10	1637.4	1684.6	75.15751	24.84	36	60	10	25			
4.75	623	2507.8	100	0.00	0	10	0	5			
	2507.8						2314				



Figure 4.2: Sieve analysis test result of RCM (Coarse Fraction Gradation)

Grading for fines (natural sand)

Test result of sieve analysis of natural sand is given in Table 4.3.

Table 4.3: Sieve analysis test result for sand

Sieve Size	Retained	ΣRetained	% 2(Ret)	%Passing	BS 882							
(2)Sand					0.e	rall	Coa	rse	Medi	um	Fin	6
10					100				200			
5	55 7	55.7	7.467489	92 53	89	100						
2.36	111	166.7	22.34684	77.65	60	100	60	100	65	100	80	100
1.18	211.4	378.1	50.69044	49.31	30	100	39	90	45	100	70	100
0.6	203-3	581.4	77.94611	22.05	15	100	15	54	25	80	55	100
0.3	118.4	699.8	93.81955	6.13	5	70	5	40	5	45	5	70
0.15	36.1	735.9	98.65934	1.34	0	15						1
0	10	745.9	100	0.00								100
	745.9											



Figure 4.3: Sieve analysis test result of sand

There are several reasons for specifying both grading limits and maximum aggregate size. Aggregate having a smooth grading curve and neither a deficiency nor excess of any one-particle size generally produce mixtures with fewer voids between particles. Because cement costs more than aggregate and the cement paste requirement for concrete increases with increasing void content of the combined aggregate, it is desirable to keep the void content as low as possible.

4.1.2 Density of RCM

Density is the most fundamental classification parameter. Aggregate density constitutes a very important parameter for accurate batching and concrete mix design, which is influenced by variations in the composition of the recycled materials. For coarse recycled aggregate test was carried out for two samples.

The test results are listed in Table 4.4 for fine recycled aggregate (FRA) & coarse recycled aggregate (CRA). Typical density values for fine aggregate (sand) and coarse aggregate (NA) are also listed in Table 4.4.

Table 4.4 Recycled Material Properties

Properties of aggregate	EDA	C	RA			
riopernes of aggregate	FKA	Sample1	Sample 2	Sand	NA	
Relative density of Saturated and surface dried basis	2.31	2.56	2.39	2.66	2.71	
Apparent relative density	2.73	2.76	2.62	2.70	2.70	
Relative density oven dried basis	2.07	2.44	2.34	2.64	2.64	

The lower density of recycled aggregate is due to the existence of pores and less dense residual mortar lumps or particles adhering to the surface of larger aggregate particles.

Bulk density of coarse and fine aggregate

- Bulk density of coarse aggregate 1303.7 kg/m³
- Bulk density of fine aggregate 1211.1 kg/m³

4.1.3 Water Absorption of RCM

Water absorption is the amount of moisture absorbed in the aggregate. The water absorption capacity is based on saturated surface dry condition and oven-dried condition. Australian Standard HB64 (2002) mentioned that the amount of water in concrete mix has direct effect on the setting time and compressive strength of concrete. It also stated that adjustment should be made to moisture content of the aggregate before preparing a mix design.

Water absorption is also one of the key performance indicators for recycled aggregate (RA) and it was determined in accordance with procedure given in ASTM C128 & C127. Water absorption obtained for coarse and fine recycled aggregates are given below.

*	Coarse aggregate	- 4.75 %
*	Fine aggregate	- 11.73 %

Water absorption values of sand and natural coarse aggregate are 0.87% and 0.33% respectively. According to the test result the water absorption of recycled aggregate is higher than that of ordinary aggregates.

RA exhibits water absorption higher than 15 % is not acceptable in many countries: a maximum of 10 % is accepted for many construction applications (Jose, 2002; Katz, 2003; Rao, 2005). Since the absorption is a significant parameter in the concrete mix design, it has to be paid greater attention when taking the effective water amount.

4.1.4 Aggregate Impact Value (AIV)

Aggregate impact value indicates the resistance of aggregate to sudden impact. For heavy-duty concrete elements, AIV should be less than 25%. For subbase application it should be less than 35% and 30 % for other lower-grade applications.

Aggregate AIV test was carried out according to the BS standard. Aggregate impact value obtained for recycled coarse aggregate was 14.9 %. It satisfies even for heavy-duty concrete.

4.2 DEVELOPMENT OF MIX DESIGN FOR RCA CONCRETE

Mix Design Procedure

Mix design can be defined as the process of selecting and proportioning the constitutive materials of concrete to produce an economical concrete, which has certain minimum desirable properties such as strength, workability and durability.

DOE method is used for concrete mix proportioning with normal aggregate. Concrete trial mix was also prepared with recycled aggregate based on DOE method.

Normally, specified strength for low volume concrete roads is grade 20. Therefore characteristic strength of 20 N/mm² at 28 days was considered for concrete low volume roads design.

Concrete mix design procedure was given below.

Calculation of quantities for trial mix according to DOE method

Specified characteristic strength of concrete = 20 N/mm^2 at 28 days with 10% defective

As there is insufficient data to calculate the variation in strength of concrete produced in the laboratory, the standard deviation was obtained from curve A given Figure 4.4.



Figure 4.4: Relationship between std.deviation and characteristic strength (DOE method published Figure)

Standard deviation = 8 N/mm^2

K= 1.28 for 10 % defective from Table 4.5

Table 4.5 Probability factor K (DOE method published Table)

% of Defective	K
10	1.28
5	1.64
2.5	1.96
1	2.33

Margin = Kx Standard deviation

= 1.28 x 8

 $= 10.24 \text{ N/mm}^2$

Target mean Strength = characteristic strength + margin

$$= 20 \text{ N/mm}^2 + 10.24 \text{ N/mm}^2$$

 $= 30.24 \text{ N/mm}^2$

Cement Type = Ordinary Portland cement

Aggregate type Coarse: crushed

Fine : uncrushed

From Table 4.6, approximate 28 days compressive strength of a concrete with free water/cement ratio of 0.5 made out of the crushed aggregate and cement is 48 N/mm².

Table 4.6 Strength of normal concrete mixes at 0.5 w/c ratio (DOE method published Table)

	Type of		Age (days)	
Type of Cement	coarse aggregate	3	7	28	91
OPCor	Uncrushed	22	30	42	49
S.R.P.C	Crushed	27	36	48	56
R.H.P.C	Uncrushed	29	37	48	54
	Crushed	34	43	55	61

The curve through (0.5, 48) parallel to the family of curves in Figure 4.5, free water / cement ratio of 0.66 at the target mean strength.







Specified maximum free water/ cement ratio 0.60. Use the lower value.

Hence the free water cement ratio = 0.60

The specified slump = 60 mm

The maximum size of aggregate is 20 mm. From Table 4.7, the approximate free water content required to give the specified slump with maximum size of aggregate is 225 kg/m^3 for crushed aggregate and 195 kg/m^3 for uncrushed aggregate.



Table 4.7 Approximate free water content required to give various levels of workability (DOE method published Table)

Maximum size of	Type of	Type of Slump (mm), V-B (sec)				
aggregate (mm)	coarse	0-10	10-30	30-60	60-180	
(in)	aggregate	>12	6-12	3-6	0-3	
	Uncrushed	150	180	205	225	
10(3/8)	Crushed	180	205	230	250	
	Uncrushed	135	160	180	195	
20(3/4)	Crushed	170	190	210	225	
	Uncrushed	115	140	160	175	
40(3/2)	Crushed	155	175	190	205	

Used free water content = 210kg/m^3

Hence, cement content = Free water content / (w/c) ratio

 $= 350 \text{ kg}/\text{m}^3$



Figure 4.6: Estimated wet density for fully compacted concrete (DOE method published Figure)

The relative density of aggregate on a saturated surface dry basis = 2.56

From Figure 4.6, concrete density = 2350 kg/m^3

(Total aggregate content = concrete density – free water content – cement content) Total aggregate content = 1790 kg/m^3



Figure 4.7: Recommended % of fine aggregate as a function of free w/c ratio for various values of workability and max.agg.sizes (DOE method published Figure)

The curves in the Figure 4.7 are relevant to the % of fines passing through a 600 micrometer sieve. Percentage of fines passing through that curve was 70%.

From Figure 4.7, the proportion of fine aggregate is 34.8%.

Fine aggregate content = Total aggregate content x fine aggregate proportion

$$= 623 \text{ kg/m}^3$$

The fine aggregate content = 623 kg/m3

Coarse aggregate content = Total aggregate content - fine aggregate content

Coarse aggregate content = 1167 kg/m3

For a mix adjustment for the estimated coarse and fine aggregate contents should be done, to account for the surface moisture after the calculation of required quantities. Adjustments were sequentially made according to the moisture contents and water absorption capacity of the respective aggregates.

To account for the surface moisture, adjustment for the estimated coarse and fine aggregate contents is determined using eq 4.1.

Moist aggregate content = SSD aggregate content *
$$\left[1 + \left(\frac{MC - WA}{100}\right)\right] - eq 4.1$$

Where; MC = Moisture content WA = Water absorption

To determine the required moist coarse aggregate content and fine aggregate content water absorption value and moisture content of coarse and fine aggregate should be known values. Water absorption value of each aggregates are determined according to ASTM C128 & C127 as in section 4.1.3. Surface moisture is determined by oven drying. Calculation sheet to determine the required moist coarse aggregate content is as follows.

Adjustment of estimated coarse and fine aggregate content to account for the surface moisture

Water absorption of coarse aggregate (WA _c)	=%
Moisture content of coarse aggregate (MC _c)	=%
Water absorption of fine aggregate (WA _f)	=%
Moisture content of fine aggregate (MC _f)	= %

Moist coarse aggregate content =SSD coarse aggregate content * $\left[1 + \left(\frac{MCc - WAc}{100}\right)\right]$ Moist fine aggregate content = SSD fine aggregate content * $\left[1 + \left(\frac{MCf - WAf}{100}\right)\right]$

Where; SSD = Saturated surface density

The required fine aggregate proportion was about 34.8%. According to the particle distribution test, the recycled aggregate consists of 62% coarse aggregate and 38% fine aggregate. Natural coarse aggregate and fine aggregate was replaced with recycled aggregate as the first trial (mix-A).

Testing was carried out to find slump, compressive strength, modulus of elasticity and flexural strength for mix A. Compressive strength tests on standard 150 mm concrete cubes were carried out at age's 7days, 14 days and 28 days. Flexural strength and modulus of elasticity test was carried out at 28 days.

Figure 4.8 & Figure 4.9 show the experimental set up for slump test and flexural strength test.



Figure 4.8: Slump test



Figure 4.9: Flexural strength test

Obtained concrete properties for mix- A are given below

Slump	- 25mm
Compressive strength	-20.12 N/mm ²
Modulus of elasticity	-12375 MPa
Flexural strength	- 1.919 N/mm ²

Result indicates that it is difficult to obtain workable mix if both fine and coarse fractions are replaced by recycled material. And also it couldn't achieve the target compressive strength from the trial mix-A. Therefore, to obtain a workable mix, mix B-1 was designed by replacing recycled fine aggregate with river sand.

Relative saturated surface dried density of aggregate was taken as 2.39 in the calculation. DOE method was carried out for fixed cement content of 320 kg/m³. Maximum free water- cement ratio is taken as 0.58. Mix proportion calculation sheet for mix B -1 is given in Table 4.8.

Table 4.8 Concrete mix design form for mix- B-1

	Item	Reference calculation	Reference or Values calculation				
1	Characteristic Strength	Specified		20N/mm ² at	28 days		
	Standard deviation	Fig 4.4		8N/mm ²			
	Margin	Kx Standa deviation	urd	10.24 N/mr	n ²		
	Target mean strength	$f_m = f_s + M$	[20 + 10.24 = N/mm ²	= 30.24		
	Cement type	Specified		OPC			
	Aggregate type: coarse			Crushed			
	Aggregate type: fine			Uncrushed			
	Free-water/cement ratio	Table 4.6,	Fig 4.5	0.66			
-	Maximum free- water/cement ratio	Specified		0.58 Use the lower value 0.58		0.58 Use the lower valu 0.58	
2	Slump	Specified		75 mm			
	Maximum aggregate size	Specified		20 mm	20 mm		
	Free – water content	= 320 * 0.58		185.6 kg/m ³			
3	Cement content			320 kg/m ³			
4	Relative density of aggregate (SSD)			2.39			
	Concrete density	Fig 4.6		2225.6 kg/m ³			
	Total aggregate content	= 2225.6-	185.6-320	1720 kg/m ³			
5	Grading of fine aggregate	Percentage passing 78 % 600 m sieve		78 %			
	Proportion of fine aggregate	Fig 4.7		30%			
	Fine aggregate content	= 1720* 30		516 kg/m ³			
	Coarse aggregate content	=1720-516		1204 kg/m ³			
Qua	antities	Cement	Water (kg)	Water Fine Coarse aggregate aggrega			
Dor	trial mix of 1 m ³	320	185.6	516	1204		

Testing was carried out to find slump, compressive strength, modulus of elasticity and flexural strength for mix B -1 also.

Slump	- 147mm
Compressive strength @ 28 day	- 29.15 N/mm ²
Modulus of elasticity	-13043 MPa
Flexural strength	- 2.867 N/mm ²

The curve was plot in Figure 4.5 through the point (0.58, 29.15) parallel to the family of curves. Then for compressive strength of 30 N/mm² free water cement ratio was determined. For that modified free water/cement ratio of 0.55 another mix proportions was developed for fixed cement content of 320 kg/m³ according to the above mix design procedure. It was named as mix B-2.

Test results of fresh and harden properties of mix B -2 are given below.

Slump	-38 mm		
Compressive strength @ 28 day	-30.99 N/mm ²		
Modulus of elasticity	-14825 MPa		
Flexural strength	- 3.870 N/mm ²		

Since it wasn't a workable mix, it was modified by increasing the water/cement ratio to 0.56. Obtained concrete properties are as follows.

Slump	-75 mm		
Compressive strength @ 28 day	-31.12 N/mm ²		
Modulus of elasticity	-13564 MPa		
Flexural strength	- 3.630 N/mm ²		

Obtained fresh and harden concrete properties for each of the trial mixes are summarized in Table 4.9 and Table 4.10 respectively.

Table 4.9 Mix proportions for RAC

Aggregate		Target	Mix Proportions, kg/m ³				
Mix			Strength	PC	Free	Aggregates amount (kg)	
	Coarse	Fine	(romm)		water	Coarse	Fine
A (W/C 0.6)	RA	RA	30	350	210	1167	623
B-1 (W/C 0.58)	RA	N	30	320	185.5	1204	516
B-2 (W/C 0.55)	RA	N	30	320	176	1218	522
B-3 (W/C 0.56)	RA	N	30	320	180	1211	519

RA – Recycled aggregate

N- River sand

Table 4.10 Fresh and harden concrete properties with RA

		Fresh Properties	Harden Concrete Properties			
Туре	cement ratio	Slump (mm)	Compressive Strength @ 28 days (N/mm ²)	Elastic Modulus (MPa)	Flexural Strength (N/mm ²)	
A	0.6	25	20.12	12375	1.919	
B-1	0.58	147	29.15	13043	2.867	
B-2	0.55	38	30.99	14825	3.870	
B-3	0.56	75	31.12	13564	3.630	

The influence of coarse RA on compressive strength development is plotted in Figure 4.10.

Age	Compressive Strength (N/mm ²)				
(days)	A W/C 0.6	B-1 W/C 0.58	B-2 W/C 0.55	B-3 W/C 0.56	
7	14.26	22.22	26.07	22.44	
14	18.47	26.24	29.30	28.22	
28	20.12	29.15	30.99	31.12	

Table 4.11 Compressive Strength Data



Figure 4.10: Strength development of RCM concrete

4.3 IMPROVEMENT OF THE PROPERTIES OF FRESH AND HARDENED RCA BY USING ADMIXTURE

Admixtures can be used to modify / improve the properties of fresh and hardened concrete. Three advantages could be achieved by using water-reducing admixture. Advantages of water-reducing admixture are:

- 1. Increase the workability
- 2. Achieve higher compressive strength and
- 3. Cement saving

However, all three benefits might not be obtained at the same time.

There are two type of water reducing admixtures. Those two types are normal plasticizers and superplasticizers. Water reduction of 5% to 10% can be obtained from normal plasticizers while 25% to 30% water reduction can be obtained from superplasticizers. POZZOLITH 225 was used in mixes as water reducing admixture with the aim of increasing its workability, dosage range is 280 ml to 560 ml/100 kg of cement.

Minimum dosage was used to improve trial mix B-1 & mix B-3 while average dosage of 420 ml/100 kg of cement was used to improve only the mix B-3. Those improved mixes were named as mix C (when using minimum dosage) and mix D (when using average dosage).

Mix C-1 for improved mix B-1 with minimum dosage of admixture Mix C-3 for improved mix B-3 with minimum dosage of admixture Mix D-3 for improved mix B-3 with average dosage of admixture

With aim of improving strength of trial mixes, the water content was reduced by 10%. Test results of concrete properties when using the minimum and average dosage of admixture are given in Table 4.12.



Concrete Properties		Minimum dosage of POZZOLITH 225		Average dosage of POZZOLITH 225	
		mix C-1	mix C-3	mix D-3	
Compressive	7 days	23.34	23.45	24.93	
Strength	14days	27.87	28.48	28.82	
(N/mm²)	28days	29.21	31.89	32.56	
Slump (mm)		105	67	71	
Flexural (N/mm ²)	Strength	3.01	3.71	3.78	

Table 4.12 Improved concrete properties using admixture

From the test result there is a little improvement in concrete properties by using the plasticizing admixtures. And also the average dosage of admixture showed better results than minimum dosage of admixture.

4.4 COMPARISON OF NORMAL AGGREGATE CONCRETE PROPERTIES AND RECYCLED AGGREGATE CONCRETE PROPERTIES

To evaluate the economic feasibility of this project mix proportions obtained with natural aggregates and recycle aggregate are given in Table 4.13.

Table 4.13 Comparison of concrete properties for normal aggregate and recycled aggregate

Properties of	Normal	Recycled
Concrete Mix	aggregate	aggregate
Slump (mm)	85	75
Compressive Strength		
$@ 28 \text{ days} (\text{N/mm}^2)$	36.92	30.99
Flexural Strength@		
28 days (N/mm^2)	3.98	3.63
Elastic Modulus@28		
days (MPa)	23521	13564

When compared normal aggregate concrete properties with recycled aggregate concrete properties, slump, compressive strength and flexural strength values of recycle aggregate concrete mix are lower than those of normal concrete aggregate properties. The modulus of elasticity of recycled aggregate concrete is significantly lower than normal aggregate concrete.

Pavement design was carried out for the properties of mix B-3.

CHAPTER 5 DETERMINATION OF PAVEMENT DIMENSION

5.1 Determination of a Suitable Pavement Width for Rigid Pavement Based on the Maximum Axle Load in Provincial Roads

An optimum pavement dimension for provincial roads was proposed based on the traffic volume and the recycled aggregate concrete properties. Fatigue analysis (to control fatigue cracking) and erosion analysis (to control foundation and shoulder erosion, pumping and faulting) are the two design criteria in rigid pavement design. Fatigue analysis will usually control the design of light – traffic pavements while erosion analysis controls the design of medium-and heavy traffic pavement. Therefore erosion analysis was not considered to propose a pavement thickness for provincial roads. Fatigue analysis was regarded as the main parameter to propose a suitable width for rigid pavement. It is speculated that concrete will not fail by fatigue when the stress ratio is smaller than 0.5. The required slab thickness should be obtained such that the stress ratio is limiting to 0.5. The maximum generated stress-strain can be obtained from FEACON software. FEACON is 2D finite element software.

Stress & strain generated within the slab was determined using FEACON based on axle load of provincial road. Three loading panels were considered for the analysis. The loading panel was the mid slab panel. Required flexural strength was determined based on the stress value obtained from FEACON. Required flexural strength was compared with the obtained recycled aggregate concrete properties.

According to axle load analysis in Chapter 3 (Table3.3) maximum axle loads was 52 kN in provincial roads. Stress-strain generated within the slab was determined using 2D finite element modeling software (FEACON) based on axle load of 52 kN to a pavement thickness of 150mm (6in) to find out a suitable pavement width.

Normally the roads with a less traffic volume are designed with a pavement width of 2.4m (8ft), 3.05m (10ft) and 3.66m (12ft)in Sri Lanka. Stress variation was determined for slab width of 2.4m (8ft), 3.05m (10ft) and 3.66m (12ft) to find out a suitable pavement width.

In this analysis three wheel paths were considered; slab edge, middle of slab and 0.3m (1ft) away from the slab edge. Two loading positions were considered for the analysis, i.e. corner and middle. Considered wheel paths and the loading positions are given in Appendix D.

The critical loading position for all wheel paths is the corner loading position since the induced stresses for corner loading are higher than that of middle loading position. Figure 5.2 shows wheel path which gives higher stresses. Therefore stresses were determined for corner loading position (when two wheels at the joint) by varying the pavement widths. The stress variation for typical pavement widths used [2.4m (8ft), 3.05m (10ft) and 3.66m (12ft)] are shown in Figure 5.1.





Figure 5.1: Stress Variation according to Slab width



Figure 5.2: Critical wheel path

It can be seen that 2.4m (8ft) slab is under high stresses for all wheel paths. Stresses induced in the concrete pavement slab width of 3.05m (10ft) or 3.66m (12ft) are low compared with that of 8ft when the wheel path is away from slab edge. On the other hand the probability of wheel moves to the edge is very low since the pavement is wide enough to keep lateral clearance.

Induced stresses for the slab width of 3.66m (12ft) are same for the middle wheel path and the wheels are moving 0.3m (1ft) away from slab edge since the lateral clearance is same for two wheel paths.

Probability to move vehicle to edges is same in 3.66 m (12ft) slab and 3.05m (10 ft) slab since there is lateral clearance in both pavements. Based on the above considerations slab width of 3.05 m (10ft) was selected for the continuation of the analyzing.

There is a significance difference in stresses when wheels are moving at the slab edge and 0.3m away from the edge. Therefore vehicles should not allowed to drive to the edge at all times unless in an unavoidable circumstance. Traffic claming measures have to be proposed when designing the roads to avoid vehicles to move to edge.

5.2 Determination of Minimum Required Pavement thickness for RAC and NAC

The obtained elastic modulus values of RAC trial mixes are in the range of 12×10^3 N/mm² to 15×10^3 N/mm². For normal aggregate concrete, elastic modulus was 23521 N/mm². Stresses in the loading slab were obtained for a concrete pavement thickness of 100 mm (4in), 125 mm (5in), 137.5 mm (5.5in) & 150 mm (6in) for an axle load of 52 kN for range of elastic modulus of 10×10^3 N/mm² to 25×10^3 N/mm².

Fig 5.3 shows the stress variation within the slab for pavement thickness of 100 mm (4in), 125 mm (5in), 137.5 mm (5.5in) & 150 mm (6in) with a subgrade CBR value of 12.



Figure 5.3: Stress variation for different Elastic Modulus for 52 kN axle load

The required flexural strength was computed for the generated stress values to result in an unlimited number of repetitions in fatigue. Stress ratio should be limited to 0.5 for allowing unlimited repetitions without fatigue failure.

Stress Ratio = $\frac{Actual Generated Stress}{Modulus of Rufture}$ Required Flexural Strength = $\frac{Generated Stress}{0.5}$



Figure 5.4 shows that the required flexural strength increases with elastic modulus of concrete.



Figure 5.4: Required flexural strength to limit the stress ratio to 0.5

Concrete trial mix of B-3 need pavement thickness of 125mm (5in) for maximum axle load in provincial roads while normal concrete also need a pavement thickness of 125mm (5in). Proposed pavement thicknesses are same for provincial roads with RAC (recycled aggregate concrete) and NAC (normal aggregate concrete). It's due to the higher modulus of elasticity of NAC. With the increase of modulus of elasticity of concrete developed stresses are high. Therefore higher flexural strength is required to result in to an unlimited number of repetitions for NAC. Pavement thickness of 125 mm is satisfied the fatigue requirement.

5.3 Selection of Suitable Thickness for Provincial Roads

The pavement thickness for provincial roads was estimated using the available rigid pavement design guideline; (1) PCA guideline (Portland Cement Association guideline) & (2) AASHTO guideline.

This section provides the design charts to estimate an economical thickness based on the concrete properties of mix B-3, subgrade reaction and axle loads.

The design charts were developed by calculation the stresses of provincial roads using the FEACON software. One of the input parameter into the software is subgrade resilient modulus. Subgrade resilient modulus was determined using developed graph in Figure 5.5. The graph developed by using the chart "approximate relationship between k values and other soil properties" in Pavement Analysis and Design book by Yang H. Huang.



Figure 5.5: Modulus of subgrade reaction vs CBR value

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Developed stress within the slab is a function of pavement thickness, modulus of subgrade reaction, elastic modulus of concrete and applied load. Fig 5.6 - 5.9 can be used to estimate stresses in concrete slab for different subgrade conditions and axle loads.

Different pavement thickness of 100mm (4in), 125 mm (5in), 137.5 mm (5.5in) & 150 mm (6in) were considered in developing Fig 5.6 to Fig.5.9.

Design charts have been developed for a fixed elastic modulus value (13564 MPa) (i.e the trial mix B-3's elastic modulus value). The flexural strength of the mix B-3 was 3.63 MPa.

Following subgrade CBR values were considered;

- 1. CBR 8.5....Subgrade Modulus 0.175kci
- 2. CBR 12.... Subgrade Modulus 0.215kci
- 3. CBR 20.... Subgrade Modulus 0.290kci
- 4. CBR 36.....Subgrade Modulus 0.400kci

The required pavement thickness can be obtained from Fig.'s 5.6-5.9 by limiting the stress ratio to 0.5 for the selected maximum wheel load & subgrade CBR value.

As the first trial, a smaller thickness should be considered.

If the stress ratio is exceeded 0.5 for the maximum wheel load & subgrade CBR value for the minimum pavement thickness of 100mm (4 in), next pavement thickness of 125mm (5 in) should be checked for second trial.



Figure 5.6: Loads vs. Stress relationship for a slab thickness of 100mm



Figure 5.7: Loads vs. Stress relationship for a slab thickness of 125mm

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Figure 5.8: Loads vs. Stress relationship for a slab thickness of 137.5 mm



According to the mix B-3 concrete property, the generated stress for applied load should be less than 1.82 MPa since the flexural strength of RAC was 3.63 MPa. Horizontal lines shown in Fig 5.6 - 5.9 show the fatigue limit. Allowed maximum axle load can be obtained for a particular subgrade CBR value to avoid fatigue cracking.

Normally, low volume roads are constructed to a 100mm pavement thickness using portland cement and virgin aggregate. According to the mix B-3 concrete property, maximum allowable axle load for pavement thickness of 100mm is 38 kN for subgrade CBR value of 12 to result in an unlimited number of repetition. Maximum axle load in provincial roads is 52 kN. So, higher pavement thickness should be introduced for provincial roads when recycled aggregate is used instead of virgin aggregate to make concrete.

Allowable maximum axle load for pavement thickness of 125 mm (5in), 137.5 mm (5.5in) & 150 mm (6in) is 51kN, 59kN and 67 kN respectively based on designed chart in Fig 5.7 - 5.9 without any fatigue failure for CBR 12 subgrade.

Pavement thickness of 125 mm (5in) can be proposed for the maximum axle load in provincial roads.

Proposed pavement thickness is for the maximum axle load in provincial roads. But the fatigue design criterion is to keep pavement stresses within the safe limit due to repeated loads and thus prevent fatigue cracking. So required pavement thickness was calculated for the repeated load for each of vehicles in provincial roads for different ADT of 1000, 2000, 3000 and 5000. Vehicle compostions for different ADT are given in Table 5.1.

			ADT O	Roads	
	Vehicle	1000	2000	3000	5000
Vehicle Type	composition (%)	1000	160	240	400
	8	80	100		
Light Good Vehicle			200	300	500
Medium Good	10	100	200	010	350
Vehicle (< 8.5T)	10	70	140	210	150
Medium Bus	7	30	60	90	150
Large Bus	3	-	440	210	350
Large Lorries	7	70	90	120	200
(< 8.5T)	- 1	40	00		
Farm Vehicle	4				

Table 5.1 Vehicle composition for different ADT in provincial roads
To determine the pavement stresses are within the safe limit due to repeated loads, expected axle load repetitions during the design period and allowable repetition need to be calculated to obtain a pavement thickness for above ADT.

Allowable repetition

Allowable repetition can be calculated from fatigue equations developed by previous findings. Figure 5.10 shows the fatigue data obtained by several investigators.



Figure 5.10: Fatigue tests results on concrete

The broken line in Figure 5.11 shows the design curve used by the Portland Cement Association (PCA). It can be seen that the PCA fatigue curve lies below most of the failure points and is very conservative. Therefore the author used that PCA fatigue curve for the calculation of allowable repetition from a particular load value. The equation relevant to that fatigue curve is shown below.

Log N_f = 17.61 -
$$\left[17.61 * \left(\frac{\sigma}{Sc} \right) \right]$$
 eq. 5.1



Where; N_{f-} No.of Repetition σ - Developed Stress S_{c-} Flexural Strength

Expected Repetition

The expected repetitions were calculated from the eq 5.2.

 $= \frac{365 * ADT of Vehicle * \{(1 + Growth Rate) 20 - 1\}}{Growth Rate} \dots eq. 5.2$

The expected repetition was calculated assuming the growth rate of 3% for design life of 20 years.

Calculation procedure to determine a pavement thickness

Trial thickness	– 125mm
Subgrade CBR	- 12
Modulus of Rupture	– 3.63 MPa
Load safety factor (LSF)	- 1.2
Designed period	- 20 years

Table 5.2 Cumulative fatigue percent due to 5000 vpd in provincial roads

					Fatigue	Analysis	
Vehicle Type	Maximum axle load (kN)	Multified by LSF	Stress (MPa)	Stress Ratio	Expected Repitition	Allowable Repetition	Fatigue Percent
Light Good	18	21.6	0.77	0.21	3,923,075	7.31E+13	0.00
Medium Good			1 70	0.47	4 003 843	1 77E+09	0.28
(< 8.5T)	41	49.2	2 1.72 0.47 4,903,84 2 1.30 0.36 3,432,69		3,432,690	2.1E+11	0.00
Medium Bus	51	61.2	2.15	0.59	1,471,153	14934216	9.85
Large Lorries	50	62.4	2.18	0.60	3,432,690	10974630	31.28
(< 8.5T) Farm Vehicle	25	30	1.05	0.29	1,961,537	Total	41.40806

Total fatigue percent was calculated for ADT of 5000. Total fatigue damage of 41 % shows that the 125mm thickness is adequate for the design condition. The design has

59% reserve capacity available for heavy axle loads and also it raises a question of whether a 100mm thickness would be adequate for the above design. Separate calculations showed that 4in thickness is not adequate because of the excessive fatigue consumption.

Developed stress within the slab is a function of pavement thickness, modulus of subgrade reaction and axle load. Table 5.3 - 5.6 can be used to estimate stresses in concrete slab for different subgrade conditions, pavement thickness and axle loads.

By following the above calculation procedure suitable pavement thickness can be obtained for provincial roads based on load repetition and concrete properties after obtaining stresses from Table 5.3 - 5.6.

	Subara	ade CBR 8	3.5										
Axle Load		Stress	(MPa)										
(kN)	4in 5 in 5.5 in 6 in												
22	1.082	0.807	0.696	0.604									
30	1.475	1.089	0.945	0.820									
49	2.413	1.793	1.544	1.338									
37	1.820	1.351	1.165	1.014									
61	3.013	2.234	1.931	1.675									
62	3.054	2.268	1.958	1.696									

Table 5.3 Stresses for subgrade CBR of 8.5

Table 5.4 Stresses for subgrade CBR of 12

	Subgrade	CBR 12									
Avia Load	S	tress (MPa	a)								
(kN)	4in	5 in	6 in								
22	1.020	0.772	0.590								
30	1 386	1.048	0.800								
40	2 268	1.724	1.310								
49	1 717	0.986									
31	2.834 2.151 1.634										
61	2.034	2 179	1.655								
62	2.875	2.110									

	subgrade (CBR 20	
Axle Load	St	ress (MPa	
(kN)	4in	5 in	6 in
22	0.924	0.724	0.564
30	1.255	0.986	0.765
49	2.055	1.606	1 240
37	1.551	1,213	0.045
61	2.565	2.013	1 565
62	2.599	2 041	1.505
		2.041	1.080

Table 5.5 Stresses for subgrade CBR of 20

Table 5.6 Stresses for subgrade CBR of 36

	Subgrade (CBR 36	
Axle Load	S	tress (MPa	a)
(kN)	4in	5 in	6 in
22	0.814	0.665	0.530
30	1.103	0.903	0.717
49	1.806	1.475	1.179
37	1.365	1.110	0.889
61	2.255	1.841	1.469
62	2.289	1.868	1.489

For the concrete property of mix B-3, suitable pavement thickness can be obtained from Table 5.7 based on the subgrade condition and ADT of the provincial roads.

	Daven	ent Thick	ness for Al	DT (in)
Subgrade	1000	2000 vpd	3000 vpd	5000 vpd
8.5	5	5	5	5.5
12	5	5	5	5
20	4	<u> </u>	4	5

Table 5.7 Pavement thickness for different ADT

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS 6.1CONCLUSION

The research was carried out to explore the possibility of using recycled aggregates in rigid pavement construction. It was found that, the recycled aggregate could be used as an alternative material for normal aggregate in rigid pavement construction. Concrete mixes with recycled concrete aggregate can be designed in the same way as with natural aggregate, but the water content should be adjusted for water absorption of recycled aggregate.

When recycled fine portion together with coarse portion of recycled aggregate is used, it is very difficult to obtain a workable mix and other desired properties. This was due to the fact that recycled fine aggregates contain a large amount of adhered mortar, which results in difficulties in low slump, as well as a substantial drop in the modulus of elasticity and strengths. To overcome this problem only coarse fraction of recycled aggregate should be used.

Compressive strength of concrete made with recycled aggregate with a 100% replacement is less than normal aggregate concrete. The strength of recycled concrete is 15% lower than that of conventional concrete made with natural coarse aggregate.

The recycled aggregate concrete has a modulus of elasticity of at least 58% of the normal aggregate concrete.

Plasticizing admixture (POZZOLITH 225) was used to reduce the water/cement ratio enabling either higher strength or cement economy. Recycled aggregate concrete was achieved a little improvement in strength of concrete by decreasing the water/cement ratio. So cement economy couldn't be achieved using plasticizing admixtures for recycled aggregate concrete mix. Therefore, it is recommended to use superplaticizer to improve the workability of recycled aggregate concrete. Rigid pavement design and its performance depends not only the concrete properties but also the traffic loading in the pavement. Suitable pavement dimension was proposed based on the traffic loading and the recycled aggregate concrete properties.

	Vehicle	ESA Va	ariation	Maximum
Vehicle Type	(%)	Lower	Upper	Axle Load (kN)
Light Good Vehicle	8	0.00123	0.01396	31
Vehicle (< 8.5T)	10	0.00418	0.13354	51
Medium Bus	7	0.0001	0.00125	18
Large Bus	3	0.01636	0.04797	41
Large Lorries (< 8.5T)	7	0.02021	0.13866	52
Farm Vehicle	4	0.0001	0.0061	25

Following table provides summary of the axle load analysis in provincial road.

Fatigue analysis (to control fatigue cracking) and erosion analysis (to control foundation and shoulder erosion, pumping and faulting) are the two design criteria in rigid pavement design. Fatigue analysis will usually control the design of light – traffic pavements while erosion analysis controls the design of medium-and heavy traffic pavement. Therefore erosion analysis was not considered to propose a pavement thickness for provincial roads. Fatigue analysis was regarded as the main parameter to propose a suitable width for rigid pavement.

Fatigue design criterion is to keep pavement stresses within the safe limit due to repeated loads and thus prevent fatigue cracking.

Based on the analysis result of traffic loading stresses are high when wheels are moving at the slab edge. Therefore vehicles should not allowed to drive to the edge at all times unless in an unavoidable circumstance. Traffic claming measures have to be proposed when designing the roads to avoid vehicles to move to the edge. Based on traffic loading in provincial road 3.05m slab width can be proposed for those roads with traffic claming measures.

Total fatigue damage due to repeated load in provincial roads for 125mm trial thickness was 41 %. It shows that the 125 mm thickness is adequate for the design

condition. Although the design has 59% reserve capacity available for heavy axle loads and also it raises a question of whether a 100mm thickness would be adequate for the above design. Separate calculations showed that 100 mm thickness is not adequate because of the excessive fatigue consumption. That proposed thickness is 125mm for subgrade CBR value of 12, mix B-3 concrete properties and 5000 vpd.

Provincial roads can be constructed to a pavement width of 3.05m and a pavement thickness of 125 mm with the following limitations.

subgrade CBR value of 12 mix B-3 concrete properties and ADT of 5000

For the concrete property of mix B-3, suitable pavement thickness can be obtained from following table based on the subgrade condition and ADT of the provincial roads.

	Daven	pent Thick	ness for Al	DT (in)
Subgrade	1000	2000	3000	5000
CBR	vpd	vpd	vpa	vpu
8.5	5	5	5	5.5
12	5	5	5	5
20	5	5	5	5
36	4	4	4	5

6.2 RECOMMENDATIONS

Coarse and fine recycled aggregate should not be used together to entirely replace both the coarse and fine natural aggregate in concrete mixes because the strength and durability of concrete would be adversely affected. The use of the recycled fine aggregate is not recommended as the aggregate has high water absorption, which is detrimental to both fresh and hardened properties of concrete. As of today, most research and field applications on recycled aggregate have been focused on the coarse fraction.

Fine recycled aggregate constitutes a large fraction of the end products of any C & D waste recycling operation. It is desirable to maximize the amount of coarse aggregate produced when concrete is recycled and initial separation of fine and coarse fractions is required at the end product of waste recycling operation.

Traffic claming measures should be used at the design stage such that vehicles not to move to edges. The design width of the pavement should be wide enough to keep a lateral clearance.

Pavement thickness of 125 mm can be used to construct rigid pavement for provincial road based on the concrete mix B-3 properties. The design has 59% reserve capacity available for heavy axle loads with the subgrade CBR of 12.

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APPENDICES

Appendix – A	ADT of Southern F
Appendix – B	Axle load Survey of
Appendix – C	ESA of vehicles
Appendix – D	Vehicle path and le

Provincial roads iata oading position

Appendix – A

			-					1	T-	-	-	-	-	r		_		_													
			B		^o	O	O	O	O	U	υ	υ	U	υ	U	υ	C	c	υ	υ	0	0		0	យ	Ш	ш	ш	ш	ш	ш
		AADT	50	397	2121	3177	9696	170	1960	867	898	495	894	257	2047	204	687	382	249	332	522	650	383	665	203	341	787	750	802	348	007
	Tractor	Trail	41	4	64	37	36	0	113	39	73	0	12	0	0	0	0	64	20	0	0	25 1	0 1	61	0 7	0 2	53	61	613 4	28	30 1
	Large	Bus	19	6	39	0	60	9	73	6	34	6	6	10	23	0	7	0	6	4	0	62	19	40	213	213	55	28	401	13	6
	Medium	Bus	18	8	22	52	8	13	75	25	32	9	11	36	252		48	11	9	42	28	42	91	4	19	19	27	27	412	12	42
	Heavy Goods	/ehicle	26	9	197	24	9	11	126	20	46	20	e	29	105	0	87	62	13	11	56	109	0	1	128	118	43	38	451	18	11
	Medium	/ehicle /	22	58	52	107	93	S	131	86	39	124	38	29	9	40	35	75	11	2	19	237	74	28	414	17	31	33	199	15	37
ľ	Light Coods	Vehicle V	39	19	49	186	43	11	198	75	20	11	40	19	106	0	70	155	20	17	33	216	95	62	704	186	53	59	281	27	102
	Pass.	Van	5	20	0	24	71	0	14	58	8	0	53	0	0	13	0	0	2	0	0	50	0	18	80	0	0	1	0	3	0
Ī		Car	32	5	255	108	6	6	117	15	58	8	3	12	20		53	104	16	6	19	201	20	88	280	60	80	48	510	23	97
	Three	Wheel	103	98	581	1270	157	55	429	193	185	151	200	58	750	63	195	411	51	65	164	237	209	163	1196	345	92	154	949	72	319
	Motor	Cycles //	196	170	847	1369	486	62	684	347	353	166	530	69	735	88	192	500	98	177	203	471	815	238	4241	1323	425	295	986	137	360
	Road Name		Weligatta-Bundala Road	Batahena-Habarakada-Dunhene Road	Mahalweaya-Gonnoruwa-Meegahajandua Rd	Weligama-Panchaliya Road	Neluwa-Kadihingala-Deliwa-Morawaka Road	Kadduwa-Kotadupe-Dampalia Road	Deniyaya-Pallegama Road	Udugama-Bangama Road	Daiyandara-Parapamulla Kirama Road	Kapuduwa-Uduwa-Kadawedduwa Road	Bovitiyamulla-Thalawa Road	Henegama-Thelijjaawila Road	3 Welewtta-Navimana-Kekanadura Road	I Mawarala-Puwakoahahena-Handugala Road	5 Kotawila-Kirimetimulta Road	3 Mapalana-Narandeniya Road	7 Kongala-Nagelpita Road	8 Welipitiva-Radampola Road	9 Kirinaliv-Radampola Road	0 Framuduoaha-Heenatioala Road	1 Meetivacoda-Ampegama Road	2 Arachchinewatta-Amoeoama Road	2 Akmeemana- Kunuduwatta roa	A Amoorama-Alithwala Road	5 II Idavala-Aiuthwala Road	6 II in the ka-Ginnliva Road	17 Sonnyawewa-Meegahaiandura Road	18 Kirinda-Walakanda Road	to Dilana-Dinnaduwa Road
ŀ		Ŷ	1	2	3	4	5	9	7	8	თ	10	11	12	13	4	15	9	F	18	1.	10	10	10	10	10	10	10	10	10	1

AADT value of Southern Province Road



AADT value of Southern "C" class Road

0	Road Name	Motor Cycles	Three Wheel	Car	Pass. Van	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Medium Bus	Large Bus	Tractor /Trail	AADT	
-	Mahalweaya-Gonnoruwa-Meegahajandua Roi	847	581	255	0	49	52	197	22	39	62	2121	υ
2	Weligama-Panchaliya Road	1369	1270	108	24	186	107	24	52	0	37	3177	υ
3	Neluwa-Kadihingala-Dellwa-Morawaka Road	486	157	6	71	43	93	9	80	60	36	696	0
4	Kadduwa-Kotadupe-Dampalla Road	62	55	6	0	11	3	11	13	9	0	170	C
n'	Deniyaya-Pallegama Road	684	429	117	14	198	131	126	75	73	113	1960	c
1	Udugama-Bangama Road	347	193	15	58	75	86	20	25	6	39	867	C
1	7 Daiyandara-Parapamulla Kirama Road	353	185	58	8	20	39	46	32	34	73	898	C
	8 Kapuduwa-Uduwa-Kadawedduwa Road	166	151	8	0	11	124	20	6	6	0	495	C
	9 Bovitiyamulla-Thalawa Road	530	200	3	53	40	38	3	11	9	12	894	0
-	0 Henegama-Thelijjaawila Road	69	58	7	0	19	29	29	36	10	0	257	0
E	1 Welewtta-Navimana-Kekanadura Road	735	750	20	0	106	9	105	252	23	0	2047	U
Ľ	2 Mawarala-Puwakgahahena-Handugala Road	88	63		13	0	40	0		0	0	204	0
-	13 Kotawila-Kirimetimulla Road	192	195	53	0	70	35	87	48	7	0	687	0
-	14 Mapalana-Narandeniya Road	500	411	104	0	155	75	62	11	0	64	382	0
-	15 Kongala-Naaelpita Road	98	51	16	2	20	11	13	6	6	20	249	0
-	16 Welipitiya-Radampola Road	177	<u>9</u>	6	0	17	2	11	42	4	0	332	
-	17 Kinnaliy-Radampola Road	203	164	19	0	33	19	56	28	0	0	522	
	Mean	406.24	292.82	53.75	14.29	64.88	52.65	48.00	41.88	7.18 2	7.53 1(14	
	Standard Deviation	340.35	311.47	64.83	22.69	59.98	40.91	51.95	57.36 2	1.21 3	4.46		
		582.14	453.81	87.26	26.02	95.88	73.79	74.85	71.52 21	8.14 4	5.34		
		230.33	131.84	20.24	2.57	33.88	31.50	21.15	12.23 6	3.22 5	0.72		

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Tractor /Trail	3.72	1.16	3.72	0.00	5.77	4.50	8.13	0.00	0.78	0.00	0.00	0.00	0.00	4.63	8.03	0.00	0.00	2.38	2.86	3.86	0.90
Large Bus	1.84	0.00	6.19	3.53	3.72	1.04	3.79	1.82	1.01	3.89	1.12	0.00	1.02	0.00	3.61	1.20	0.00	1.99	1.76	2.90	1.08
Medium Bus	1.04	1.64	0.83	7.65	3.83	2.88	3.56	1.21	1.23	14.01	12.31	0.00	6.99	0.80	3.61	12.65	5.36	4.68	4.39	6.95	2.41
Heavy Goods Vehicle	9.29	0.76	0.62	6.47	6.43	2.31	5.12	4.04	0.34	11.28	5.13	0.00	12.66	4.49	5.22	3.31	10.73	5.19	3.82	7.16	3.21
Medium Goods Vehicle	2.45	3.37	9.60	1.76	6.68	9.92	4.34	25.05	4.25	11.28	0.29	19.61	5.09	5.43	4.42	2.11	3.64	7.02	6.36	10.30	3.73
Light Goods Vehicle	2.31	5.85	4.44	6.47	10.10	8.65	7.80	2.22	4.47	7.39	5.18	00'0	10.19	11.22	8.03	5.12	6.32	6.22	2.95	7.74	4.70
Pass. Van	00.0	0.76	7.33	00.0	0.71	69.69	0.89	0.00	5.93	00.00	0.00	6.37	0.00	0.00	0.80	0.00	00.00	1.73	2.72	3.14	0.33
Car	12.02	3.40	0.93	5.29	5.97	1.73	6.46	1.62	0.34	2.72	3.42	00.0	7.71	7.53	6.43	2.71	3.64	4.23	3.08	5.82	2.64
Three Wheel	27.39	39.97	16.20	32.35	21.89	22.26	20.60	30.51	22.37	22.57	36.64	30.88	28.38	29.74	20.48	19.58	31.42	26.66	6.37	29.95	23.37
Motor Cycles	39.93	43.09	50.15	36.47	34.90	40.02	39.31	33.54	59.28	26.85	35.91	43.14	27.95	36.18	39.36	53.31	38.89	39.90	8.06	44.06	35.73
Road Name	Mahalweaya-Gonnoruwa-Meegahajandua Roi	2 Weligama-Panchaliya Road	3 Neluwa-Kadihingala-Deliwa-Morawaka Road	4 Kadduwa-Kotadupe-Dampalla Road	5 Deniyaya-Pallegama Road	6 Udugama-Bangama Road	7 Daiyandara-Parapamulla Kirama Road	8 Kapuduwa-Uduwa-Kadawedduwa Road	9 Bovitiyamulla-Thalawa Road	10 Henegama-Thelijjaawila Road	11 Welewtta-Navimana-Kekanadura Road	12 Mawarala-Puwakgahahena-Handugala Road	13 Kotawila-Kirimetimulla Road	14 Mapalana-Narandeniya Road	15 Kongala-Naaelpita Road	16 Welipitiya-Radampola Road	17 Kirinaliy-Radampola Road	Mean	Standard Deviation		
Ŷ	-	2	ŝ	A		Ľ	Ľ	L		5	Ľ	Ľ	-		-		-				

Appendix – B

Vehicle Type - 5- Medium Passenger Vehicles

6- Large Passenger Vehicles

7- Light Goods Vehicles

8- Medium Goods Vehicles

9- Large Lorries

10 - Three Axles Vehicles (Combined)

11- Three Axles Vehicles (Articulated)
12- Four Axles Vehicles (Articulated)
13- Five Axles Vehicles (Articulated)
14- Six Axles Vehicles (Articulated)
15 - Farm Vehicles

AXLE LOAD Survey at Panawala - Maniyangana Rd on 2007/12/12

/angana	ESA		0.0031	0.0727	0.0001	0.0207	0.0064						0.0068
To Manij	# of Vehicle		1	20	12	7	1 1				_		6
awala	ESA		0.0092	0.1309	0.0004	0.0952	0.0043	0.0202					
To Pan	# of Vehicle		1	19	8	8	2	1					
ection	ESA		0.0062	0.1010	0.0002	0.0604	0.0050	0.0202					0.0068
Both Dir	# of Vehicle		2	39	20	15	e	1					9
Vehicle Classification	Name	Van	Medium Bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle (<8.5 T)	Large Lorries (>8.5 T)	Three Axles Vehicle Combined	Three Axles Vehicle Articulated	Four Axles Vehicle Articulated	Five Axles Vehicle Articulated	Five Axles Vehicle Articulated	Farm Vehicles
	Code	4	5	9	2	8	6	10	11 11	12	13	14	15
Mada of	Analysis					pe	aun	sea	W				



AXLE LOAD Survey at Chillaw - Iranawila - Nainamadama Rd on 2007/11/29

nawila	ESA			0.0017	0.0103	0.0004	0.0828					_		0.0001
To Ira	to#	Vehicle		2	8	19	5							2
hillaw	ESA			0.0018	0.0229	0.0001	0.0043	State of						0.0009
To CI	to #	Vehicle		5	13	21	6							1
ection	ESA			0.0018	0.0181	0.0003	0.0400	00100	and the second se					0.0004
Both Dir	,io #	Vehicle		7	21	40	11							e
Vehicle Classification	Name		Van	Medium Bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle (<8.5 T)	Large Lorries (>8.5 T)	Three Axles Vehicle Combined	Three Axles Vehicle Articulated	Four Axles Vehicle Articulated	Five Axles Vehicle Articulated	Five Axles Vehicle Articulated	Farm Vehicles
	Code		4	5	9	7	8	თ	10	11	12	13	14	15
Ando of	Analysis						pe	an	SBE	W				

AXLE LOAD Survey at Bathuluoya - Dewalahandiya Rd on 2007/12/14

handiya	ESA			0.1172	0.0015	0.0031							
To Dewala	# of Vehicle			5	4	11	_						
nuluoya	ESA			0.2270	0.0005	0.0409	0.1570						0.0001
To Batt	# of Vehicle			8	10	18	3						1
rection	ESA			0.1848	0.0008	0.0266	0.1570						0.0001
Both Dii	# of Vehicle			13	14	29	3						1
Vehicle Classification	Name	Van	Medium Bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle (<8.5 T)	Large Lorries (>8.5 T)	Three Axles Vehicle Combined	Three Axles Vehicle Articulated	Four Axles Vehicle Articulated	Five Axles Vehicle Articulated	Five Axles Vehicle Articulated	Farm Vehicles
	Code	4	5	9	7	8	6	10	11	12	13	14	15
Mada of	Analysis						pə.	inse	θW				

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AXLE LOAD Survey at Udupila (Delgoda) of Kirillawala - Udupila Rd on 28-11-2007

	T		11	6	0	8	2				_	_	_
dupila	ES		0.00	0.087	0.001	0.015	0.016	-	1	-		-	
To U	# of Vehicle	-	1	2	16	29	5				-		
ilawala	ESA		0.0249	0.0642	0.0034	0.0268	0.0059	1.0502	-	-		-	1
To Kin	# of Vehicle	I	2	4	6	42	5	1	-	-		-	1
rection	ESA	-	0.0170	0.0721	0.0019	0.0223	0.0112	1.0502	-	-		-	-
Both Di	# of Vehicle	-	9	9	25	71	10	1	1	-	ł	1	-
Vehicle Classification	Name	Van	Medium Bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle (<8.5 T)	Large Lorries (>8.5 T)	Three Axles Vehicle Combined	Three Axles Vehicle Articulated	Four Axles Vehicle Articulated	Five Axles Vehicle Articulated	Six Axles Vehicle Articulated	Farm Vehicles
	Code	4	5	9	2	8	6	10	11	12	13	14	15
Mada of	Analysis					pe	มก	586	W				

AXLE LOAD Survey at Neluwa-Kadihingala- Dellawa- Morawaka Road on 05-12-

vaka	ESA			0.0152	0.0001	0.0144	0.0073						
To Morav	# of Vehicle			7	4	5 7 (1 1 0						7
eluwa	ESA			0.0137	0.0004	0.0134	0.0074						
To Ne	# of Vehicle			13	4	4	1						6
ection	ESA			0.0142	0.0003	0.0140	0.0074						
Both Dii	# of Vehicle			20	8	6	2						13
Vehicle Classification	Name	Van	Medium Bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle (<8.5 T)	Large Lorries (>8.5 T)	Three Axles Vehicle Combined	Three Axles Vehicle Articulated	Four Axles Vehicle Articulated	Five Axles Vehicle Articulated	Six Axles Vehicle Articulated	Farm Vehicles
	Code	4	5	9	7	8	6	10	11	12	13	14	15
Mada of	Analysis					p	an	588	W		10000		

Appendix – C

AXLE LOAD Survey at Panawala - Maniva

	- Adding	RO	on	20	07/	12	12
--	----------	----	----	----	-----	----	----

Sr	DIR	VEH	AXLE			10 NO ON 21	07/12/	2	
NO		TYPE	CONFIG	LOAD	OPIC				
-1-	1	6	1.2	Passengers	William	DESTI	A	vde Loa	d
			1.2	Passengers	Wijerama	Avisemento	AXLE1	AXLE2	AXLE3
4	1	7		Passengers	Avissauglia	Avissawella	3	3.335	
5	2	6	12	Passona	Wijerama	Wijerama	3.115	3.4	_
6	1	5	1.2	Empty	Avissawella	Avissawella	0.98	4.11	
7	1	6	1.2	Passengers	Wijerama	Wijerama	3.11	3 33	
8	1	8	1.2	Empty	Wijerama	Avissawella	2.11	2.75	
9	2	7	1.1	Food Items	Enaliyacoda	Avissawella	2.95	3.11	
10	1	8	1.2	Timber, T/Logs True	Wijese	Wijerama	1.01	0.72	
11	2	6	1.2	Empty	Avissama	Avissawella	2.52	0.685	
12			1.1	Hardwere Items	Ehaliyagoda	Wijerama	1.855	1 995	
14	1	8	1.1	Passengers	Ehaliyagoda	Avissaweila	0.98	1.13	
15	1	8	12	Empty	Wijerama	Avissawella	1.38	1.94	
16	2	6	12	Passenger	Wijerama	Avissawella	1.735	1.325	
17	2	5	1.2	Passengers	Avissawella	Ehaliyagoda	1.71	1.375	1000
18	1	6	12	Passengers	Avissawella	Wijerama	1 525	3.75	
19	1	9	1.2	Empty	Vvijerama Ebolivora	Avissawella	341	5.63	
20	2	15	1.1.1	Matal	Avissauollo	Avissawella	2.15	2.26	
21	1	10	1.22	Timber, T/Logs, True	Wijerama	Wijerama	0.63	2.46	2.72
22	1	6	1.2	Passengers	Ehaliyagoda	Avissawella	0.61	2.53	3.26
23	2	6	1.2	Passengers	Avissawella	Wijerama	3.03	4 765	
24	1		1.1	Food Items	Wijerama	Deraniyanala	3.66	4.96	
25		9	1.2	Empty	Wijerama	Avissawella	2 165	1.05	
20	2	15	1.2	Asobalt	Wijerama	Avissawella	2.8	5.315	-
28	- 2	6	12	Passenger	Avissawella	Wijerama	0.445	1.99	3.08
29	2	6	12	Passengers	Avissawella	Wijerama	2.9	4.09	
30	1	7	1.2	Wooden Prod	Wijerama	Wijerama	0.465	2.53	3.4
31	2	15	1.1.1	Empty	Avissawella	Wijerama	1.39	1.17	0.675
32	1	6	1.2	Passengers	Wijerama	Avissawella	2 335	3.09	0.675
33	1	6	1.2	Passengers	Wijerama	Avissawella	3.585	4.91	
34	1	8	1.2	Empty	Avissawella	Avissawella	2.31	1.41	
35	2	6	1.2	Passengers	Avissawella	Wijerama	2.485	3.52	
36	2	7	1.1	Empty	Avissawella	Wijerama	1.39	1.035	
37	2	1	1.1	Wooden Prod	Avissawella	Wijerama	1.085	0.87	
38	- 2	9	1.2	Empty	Wijerama	Avissawella	2.87	4.46	
40	2	0	1.2	Empty	Wijerama	Avissawella	1 545	1.045	
41	- 2	7	1.2	Empty	Wijerama	Avissawella	1.335	1.305	
42	2	6	1.1	Passengers	Avissawella	Wijerama	3.53	3.66	12.4.3
43	2	7	1.1	Empty	Avissawella	Wijerama	0.985	0.75	
44	2	6	1.2	Passengers	Avissawella	Wijerama	2.54	3.2	
45	2	7	1.1	Passengers	Avissawella	Wijerama	1.09	3 735	
46	2	8	1.2	Wooden Prod	Kandy	Avissawella	2 315	5.76	
47	1	6	1.2	Passengers	Wijerama	Wijerama	2.14	4.97	
48	2	8	1.2	Matal	AVISSawena	Avissawella	2.31	5.405	
49	1	6	1.2	Passengers	Wijerama	Tałduwa	0.84	0.51	
50	_ 2	7	1.1	Passencers	Avissawella	Wijerama	1.37	2.735	
1	2	6	1.2	Rubber/Rubber Pro	Avissawella	Wijerama	1.43	5 775	
52	- 2	8	1.2	Passengers	Wijerama	Avissawella	2.075	4 315	
53			12	Passengers	Avissawella	Wijerama	0.99	0.695	
55	2	8	12	Wooden Prod	Wijerama	Pinnawala	0.715	0.445	
56	2	7	1.1	Empty	Avissawella	Avissawella	1.305	1.21	
57	1	8	1.2	Wooden Prod	Wijerama	Wijerama	2.25	3.68	
58	2	6	1.2	Passengers	AVISSaweila	Avissawella	3.71	2.54	
59	1	6	1.2	Passengers	Wijerama	Avissawella	1.0/	1 16	
60	1	6	1.2	Passengers	Kandy	Wijerama	2 605	3.61	
61	2	7	1.1	Grocenes	Avissawella	Wijerama	0.865	0.43	
62	2	6	1.2	Passengers	Wijerama	Aviesewalla	0.92	0.87	
63	1	7	1.1	Emply	Wijerama	Avissawella	0.79	0.4	
64		8	1.2	Emply	Wijerama	Avissawella	2.76	4.605	
05	1	7	1.1	Passengers	Wijerama	Wijerama	0.92	0.42	
- 67		0	11	Passengers	Avissawella	Wijerama	2 505	4.01	
68	2		11	Electrical Goods	Meegoria NAfijerema	Avissawella	1		
69	4	6	1.2	Passengers	VVIOIDINA				

70	2	8	1.2	Emoty					
71	2	15	1.1.1	Sand	Hanwella				
72	2	8	1.2	Empty	Avissawella	Wijerama	_		
73	1	7	1.1	Emoty	Avissawella	Wijerama	1.225	1.03	-
74	2	6	1.2	Passenger	Wijerama	Wijerama	0.43	1.71	2.83
75	1	6	1.2	Passengers	Avissawella	Avissawella	1.41	1.045	
76	2	15	1.1.1	Matal	Wijerama	Wijerama	0.96	0.94	
77	2	6	1.2	Empty	Avissawella	Avissawella	2.045	2.85	
78	2	6	1.2	Passengere	Avissawella	Wijerama	0.61	5.88	
79	1	6	1.2	Passengers	Avissawella	Wijerama	243	1.96	2.29
80	2	7	1.1	Wooden Prod	Wijerama	vvijerama	2.43	4 73	
81	2	15	1.1.1	Bricks	Avissawella	Wijessawella	2.69	5.865	
82	1	6	1.2	Passengers	Avissawella	Wijerama	0.68	0.47	
83	2	6	1.2	Passengers	Wijerama	Aviseand	0.505	2.05	1.565
84	2	8	1.2	Food Items	Avissawella	Wijerama	2.625	5.95	
85	2	6	1.2	Passengers	Avissawella	Wijerama	3.245	5.18	
86	1	6	1.2	Passengers	Avissawella	Wijerama	1.375	2.47	
Note:			-		wijerama	Avissentila	3.465	6.4	
							3.4	5.4	

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Direction :

1- Panawala 2- Maniyangana

AXLE LOAD Survey at Chillaw - Iranawila - Nainamadama Rd on 2007/11/2

NO TYPE CONTIG LOAD ORG DISTI Ade Load 2 6 1.2 Passengers Wighty Sanchary Chiaw Mighty Sanchary 192 Ade Load 3 2 1.1 Passengers Mighty Sanchary 1925 2.73 5 1.1 Ti Sanchary Chiaw Mighty Sanchary 1925 2.73 6 1.5 1.1 Endergers Wipathy Sanchary 1078 0.65 0.445 7 1.7 1.7 1.8 Endergers Wipathy Sanchary 0.650 0.445 9 2 6 1.1 Endergers Chiaw Wipathy Sanchary 0.835 0.622 10 2 6 1.2 Passengers Chiaw Mipathy Sanchary 0.43 0.455 0.455 11 1.6 2.6 1.2 Passengers Mipathy Sanchary 0.42 0.455 1.65 0.52 12 1.6 1.2 Passengers Wipathy Sanch	Sr	DIP	VEH	AYIC	To Chillaw	To Iranawila	011 200		2	
1 1 6 013 Adde Laad 3 2 7 11 Passengers Chiaw Migatu Sanctuary Onizer 17 2 16 3 1 7 71 Passengers Chiaw Migatu Sanctuary 0765 0.5 1.3 11 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 <	NO	UIK	TYPE	CONFIG	LOAD	anariawita				
2 2 6 17 20 Chilaw ANLE AVLE2		1	8	12	Passan	ORIG	DISTI	A	xle Loa	d
3 2 7 11 Chilaw Chilaw <thchilaw< th=""> Chilaw Chi</thchilaw<>	2	2	6	12	Passengers	Wilpattu Sanchuary	Chilman	AXLE1	AXLE2	AXLE3
4 1 5 112 2010 Missingers Chilaw Contains Sectury 0.73 0.5 5 1 7 11 Figson Chilaw (1195) 1.43 7 1 7 1.7 Figson (1175) 2.26 (1175) 2.265 9 2 6 1.1 Chilaw (1175) 2.205 10 2.2 7 1.1 Fisson (1175) 2.205 10 2.2 7 1.1 Passengers Chilaw (1180) Sanctary 0.433 11 1.6 1.1 Fissongers (Vipatu) Sanctary 0.433 (1180) 12 1.6 1.2 Passengers (Vipatu) Sanctary 0.433 (1180) 13 1.6 1.2 Passengers (Vipatu) Sanctary 0.465 1.66 0.545 14 2.6 1.2 Passengers (Vipatu) Sanctary 0.66 <t< td=""><td>3</td><td>2</td><td>7</td><td>1.1</td><td>Fish/day Fish</td><td>Chilaw</td><td>Wilcothe Second</td><td>1.72</td><td>2.16</td><td></td></t<>	3	2	7	1.1	Fish/day Fish	Chilaw	Wilcothe Second	1.72	2.16	
5 1 7 1 2581/262 Winpatu Sancuary Onlinew Childwin Units 0.010 0.139 143 7 1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 7 1.1 1.1 7 1.1	4	1	5	1.2	Passonana	Chilaw	Wilnattu Sanctuary	1.925	2.73	
6 1 5 1.2 Passengers Winpatu Sanctury Chilaw 1.13 1.43 8 2 7 1.1 Crigov Winpatu Sanctury Chilaw 1.17 2.26 9 2 6 1.2 Corruis Chilaw Winpatu Sanctury 0.635 0.62 10 2 7 1.1 Chilaw Winpatu Sanctury 0.635 0.62 11 1.1 Fisht/dy Fish Chilaw Winpatu Sanctury 0.635 0.62 12 1.7 1.1 Fisht/dy Fish Winpatu Sanctury Chilaw 0.6 0.62 13 1.6 1.2 Passengers Chilaw Winpatu Sanctury 0.43 1.61 1.575 14 2 5 1.1 Emply Chilaw Winpatu Sanctury 0.485 1.66 0.45 15 2.1 2 7 1.1 Emply Chilaw Winpatu Sanctury 0.486 0.865 16 1.2 Passengers Chilaw Winpatu Sanctury 0.56 6.23 21<	5	1	7	1.1	Emoty	Wilpattu Sanctuary	Chilaw	0.705	0.5	
7 1 7 11 Conduct 0.003 0.443 9 2 6 12 Chilaw Wipatu Sanctuary 0.1175 2.265 10 2 7 11 Conduct Chilaw Wipatu Sanctuary 0.123 0.622 11 1 6 1.2 Passengers Winatu Sanctuary 0.173 3.43 13 1 6 1.2 Passengers Winatu Sanctuary 0.42 0.425 14 2 6 1.2 Passengers Winatu Sanctuary 0.41 0.45 15 2 8 1.2 Pengy Chilaw Winatu Sanctuary 0.46 0.52 16 2 15 1.1.1 Emply Chilaw Winatu Sanctuary 0.486 0.65 0.54 17 2.7 1.1 Emply Chilaw Winatu Sanctuary 0.486 0.65 0.44 16 1.2 Passengers Winatu Sanctuary 0.486 0.62 24 1.6 1.2 Passengers Winatu Sanctuary 0.61 <td>6</td> <td>_1</td> <td>5</td> <td>1.2</td> <td>Passengor</td> <td>Wilpattu Sanctuary</td> <td>Chilaw</td> <td>1.195</td> <td>1.43</td> <td></td>	6	_1	5	1.2	Passengor	Wilpattu Sanctuary	Chilaw	1.195	1.43	
8 2 7 11 Condust Chilaw Wipstu Sanctuary Wipstu Sanctuary 0.85 0.62 10 2 7 1. Passengers Chilaw Wipstu Sanctuary Winstu Sanctuary 0.115 0.43 11 1 1.	7	1	7	1.1	Empty	Wilpattu Sanctuary	Chilaw	1 175	2 205	-
9 2 6i 12 Possengers Chiaw Wipetu Sanchary 155 0.15 11 1 6 12 Passengers Wipetu Sanchary 2175 3.45 13 1 6 12 Passengers Wipetu Sanchary Chiaw 0.69 0.952 13 1 6 12 Passengers Wipetu Sanchary 1.21 2.06 0.52 15 2 5 1.2 Passengers Wipetu Sanchary 1.81 1.26 16 2 1.1 Empty Chiaw Wipetu Sanchary 0.43 1.65 1.65 0.545 19 2 6 1.2 Passengers Wipetu Sanchary 0.45 1.66 0.545 20 2 1 1 Lessongers Wipetu Sanchary 0.62 1.43 21 2 1.1 Lessongers Wipetu Sanchary 0.56 1.43 22 7 1.2 Empty Wip	8	_ 2	7	1.1	Coconute	Wilpattu Sanctuary	Chilaw	1.175	0.715	
10 2 7 1	9	2	6	1.2	Passenger	Chilaw	Wilpattu Sanctuary	0.835	0.62	
11 1 6 12 Passengers Winpatu Sancuary Chilaw 104 2.74 13 1 6 1.2 Passengers Winpatu Sancuary Chilaw 108 0.52 14 2 5 1.2 Passengers Chilaw Winpatu Sancuary Chilaw 0.8 0.52 15 2 5 1.2 Passengers Chilaw Winpatu Sancuary 1.93 3.12 16 2 15 1.1 Emply Chilaw Winpatu Sancuary 1.66 0.545 17 2 7 1.1 Emply Chilaw Winpatu Sancuary 0.68 0.365 20 2 7 1.1 Livestock Chilaw Negombo 1.695 1.43 21 2 7 1.1 Emply Chilaw Mogatu Sancuary 0.76 6.52 22 7 1.1 Emply Chilaw Sancuary 0.76 6.52 23 1.6 1.2 Passengers Winpatu Sancuary Chilaw 1.075 1.65 24	10	2	7	1.1	Fish/dry Eich	Chilaw	Wilpattu Sanctuary	2,175	3 43	
12 1 7 1.1 Findury Fish Winpattu Senctuary Chilaw 0.8 0.52 14 2 5 1.2 Passengers Winpattu Senctuary Chilaw 0.8 0.52 15 2 8.1 1.2 Empty Chilaw Winpattu Sanctuary 1.65 1.67 16 2 15 1.1 Empty Chilaw Winpattu Sanctuary 0.485 1.65 0.545 17 2 7 1.1 Empty Chilaw Winpattu Sanctuary 0.485 0.365 0.345 19 2 6 1.2 Passengers Chilaw Winpattu Sanctuary 0.48 0.43 0.355 1.43 20 2 7 1.1 Empty Chilaw Winpattu Sanctuary 0.975 0.62 21 2 7 1.2 Empty Chilaw Winpattu Sanctuary 0.975 0.62 22 2 1.2 Passengers Chilaw Winpattu Sanctuary 0.75 1.62 2.85 23 1.5 1	11	1	6	1.2	Passengers	Chilaw	Wennappuwa	0.42	0.495	
13 1 6 12 Passengers WippatU Sanctuary Chilaw 103 0.52 15 2 8 12 Passengers Chilaw WippatU Sanctuary 121 2.06 16 2 1.11 Emply Chilaw WilpatU Sanctuary 0.485 1.06 0.545 17 2 1.11 Emply Chilaw WilpatU Sanctuary 0.485 1.06 0.545 18 1 6 1.2 Passengers Chilaw WilpatU Sanctuary 0.68 0.355 20 2 7 1.1 Emply Chilaw WilpatU Sanctuary 0.56 0.43 21 2 7 1.2 Emply Chilaw WilpatU Sanctuary 0.56 0.43 22 2 7 1.2 Emply Chilaw WilpatU Sanctuary 0.56 0.62 23 1 6 1.2 Passengers Chilaw WilpatU Sanctuary 0.75 1.69 24 1 7 1.1 Emply Chilaw WilpatU Sanctuary<	12	1	7	1.1	Fish/dry Fish	Wilpattu Sanctuary	Chilaw	1.84	2.74	
14 2 5 12 processing of the procesing of the procesing of the procesing of the p	13	1	6	1.2	Passengers	Wilpattu Sanctuary	Chilaw	0.8	0.52	
15 2 8 12 Emply Chilaw Winpatu Sanctuary 1.21 2.06 16 2 1.11 Emply Chilaw Winpatu Sanctuary 0.485 1.06 0.545 18 1 6 1.2 Passengers Winpatu Sanctuary 0.68 0.565 2 7 1.1 Emply Chilaw Winpatu Sanctuary 2.64 4.445 20 2 7 1.1 Emply Chilaw Winpatu Sanctuary 0.58 0.43 21 2 7 1.1 Emply Chilaw Winpatu Sanctuary 0.58 0.43 22 7 1.2 Emply Chilaw Winpatu Sanctuary 0.58 0.42 23 1 6 1.2 Passengers Winpatu Sanctuary 0.44 0.92 24 1 7 1.1 Emply Winpatu Sanctuary 0.83 0.55 25 1 5 1.2 Passengers Winpatu Sanctuary 0.77 1.718 26 2.6 1.2 <td< td=""><td>14</td><td>2</td><td>5</td><td>1.2</td><td>Passengers</td><td>Wilpattu Sanctuary</td><td>Chilaw</td><td>1.93</td><td>3.12</td><td></td></td<>	14	2	5	1.2	Passengers	Wilpattu Sanctuary	Chilaw	1.93	3.12	
16 22 15 11.11 Empty Chilaw Wipatu Sanctuary 0.68 0.355 18 1 6 1.2 Passengers Wipatu Sanctuary 0.081 0.355 19 2 6 1.2 Passengers Chilaw Wipatu Sanctuary 0.081 0.355 20 2 7 1.1 Livestock Chilaw Wipatu Sanctuary 0.351 1.435 21 2 7 1.2 Empty Chilaw Wipatu Sanctuary 0.375 0.62 22 1 16 1.2 Passengers Wipatu Sanctuary Chilaw 1.045 0.925 23 1 6 1.2 Passengers Wipatu Sanctuary Chilaw 1.046 0.92 24 1 7 1.1 Empty Wipatu Sanctuary Chilaw 1.045 1.042 23 1 5 1.2 Passengers Wipatu Sanctuary Chilaw 1.045 1.055 1.045 24 7 1.1 Empty Wipatu Sanctuary Chilaw 1.055 1.055 1.055 25 1 7 1.1 Empty	15	2	8	1.2	Empty	Chilaw	Wilpattu Sanctuary	1.21	2.06	
17 2 7 11 Emply Dinaw Wilpattu Sanctuary 0.445 10.6 0.445 19 2 6 1.2 Passengers Wilpattu Sanctuary Onliaw 2.64 4.445 20 2 7 1.1 Emply Chilaw Wilpattu Sanctuary 0.58 0.365 21 2 7 1.1 Emply Chilaw Wilpattu Sanctuary 0.58 0.43 22 7 1.1 Emply Chilaw Wilpattu Sanctuary 0.58 0.45 23 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.04 0.92 23 1 5 1.2 Passengers Wilpattu Sanctuary Chilaw 1.075 1.89 23 1 5 1.2 Passengers Wilpattu Sanctuary Chilaw 1.075 1.89 24 2 7 1.1 Salt Bags Chilaw Wilpattu Sanctuary 1.025 0.59 30 1 6 1.2 Passengers Chilaw W	16	2	15	1.1.1	Empty	Chilaw	Mahawewa	1.69	1.575	
18 1 6 12 Passengers Onlaw Wilpatu Sanctuary 0.68 0.365 20 2 7 1.1 Evestock Chilaw Wilpatu Sanctuary 0.01 2.01 2.725 21 2 7 1.1 Empty Chilaw Wilpatu Sanctuary 0.98 0.43 22 2 7 1.2 Empty Chilaw Wilpatu Sanctuary 0.975 0.66 23 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 1.04 0.92 24 1 7 1.1 Empty Wilpatu Sanctuary Chilaw 1.045 1.89 25 2 6 1.2 Passengers Wilpatu Sanctuary Chilaw 1.014 1.045 1.18 29 2 7 1.1 Empty Wilpatu Sanctuary Chilaw 0.355 0.56 30 1.6 1.2 Passengers Wilpatu Sanctuary Chilas 1.15 <	17	2	7	1.1	Empty	Chilaw	Wilpattu Sanctuary	0.485	1.06	0.545
19 2 6 12 Passengers Chilaw Wippattl Sanctuary 2.01 2.725 21 2 7 1.1 Livestock Chilaw Wippattl Sanctuary 0.95 1.43 22 2 7 1.1 Empty Chilaw Wippattl Sanctuary 0.975 0.62 23 1 6 1.2 Passengers Wippattl Sanctuary Chilaw 2.36 0.43 24 1 7 1.1 Empty Wippattl Sanctuary Chilaw 1.04 0.92 25 1 5 1.2 Passengers Chilaw Wippattl Sanctuary Chilaw 1.04 0.92 26 2 6 1.2 Passengers Wippattl Sanctuary Chilaw 1.025 0.59 21 1 1.1 Empty Chilaw Wippattl Sanctuary 0.77 1.715 29 2 7 1.11 Empty Chilaw Wippattl Sanctuary 1.025 0.59 31 1 1.2 Passengers Chilaw Wippa	18	1	6	1.2	Passengers	Wilnattu Sanatur	Wilpattu Sanctuary	0.68	0.365	
20 2 7 1.1 Livestock Chilaw Wippattu Sanctuary 2.01 2.72s 22 7 1.1 Empty Chilaw Wippattu Sanctuary 0.58 0.43 23 1 6 1.2 Passengers Wippattu Sanctuary Chilaw 1.04 0.975 0.62 24 1 7 1.1 Empty Chilaw Wippattu Sanctuary Chilaw 1.04 0.92 25 1 5 1.2 Passengers Wippattu Sanctuary Chilaw 1.075 1.89 26 1 5 1.2 Passengers Wippattu Sanctuary Chilaw 1.075 1.89 27 1 5 1.2 Passengers Wippattu Sanctuary Chilaw 0.75 0.55 0.67 30 1 6 1.2 Passengers Wippattu Sanctuary Chilaw 0.555 0.67 31 1 7 1.1 Empty Chilaw Wippattu Sanct	19	2	6	1.2	Passengers	Chilaw	Chilaw	2.64	4.445	
21 27 1.1 Empty Chilaw Wiegattu Sanctuary 0.58 0.43 22 7 1.2 Empty Chilaw Wipattu Sanctuary 0.58 0.62 23 1 6 1.2 Passengers Wipattu Sanctuary Chilaw 2.35 2.85 24 1 7 1.1 Empty Wipattu Sanctuary Chilaw 1.04 0.92 25 1 5 1.2 Passengers Chilaw Wipattu Sanctuary Chilaw 1.025 0.59 28 2 7 1.1 Empty Chilaw Wipattu Sanctuary 1.025 0.59 30 1 6 1.2 Passengers Wipattu Sanctuary Chilaw 0.535 0.67 31 1 7 1.1 Liestock Manawewa Chilaw 0.535 0.67 32 1 7 1.1 Empty Wipattu Sanctuary 1.05 3.405 34 2	20	2	7	1.1	Livestock	Chilaw	wilpattu Sanctuary	2.01	2.725	
22 21 7 1.2 Empty Chiaw Wipattu Sanctuary 0.975 0.62 23 1 6 1.2 Passengers Wipattu Sanctuary Chilaw 2.35 2.85 24 1 7 1.1 Empty Wipattu Sanctuary Chilaw 1.04 0.92 25 1 5 1.2 Passengers Wiipattu Sanctuary Chilaw 1.075 1.89 26 2 6 1.2 Passengers Wiipattu Sanctuary Chilaw 1.075 1.89 27 1 1.5 I.1.8att Bags Chilaw Wiipattu Sanctuary 0.71 1.155 3.405 30 1 6 1.2 Passengers Wiipattu Sanctuary Chilaw 0.535 0.65 31 1 7 1.1 Livestock Manawewa Chilaw 0.535 0.66 32 1 7 1.1 Empty Chilaw Wiipattu Sanctuary 1.75 1.965 33 1 8 1.2 Passengers Chilaw Wii	21	2	7	1.1	Empty	Chilaw	Negombo	1.595	1.43	
1 6 1.2 Passengers Winpatu Sanctuary Chilaw 2.35 0.62 24 1 7 1.1 Emply Winpatu Sanctuary Chilaw 1.04 0.92 25 1 2.2 Passengers Winpatu Sanctuary Chilaw 1.075 1.89 26 2.6 1.2 Passengers Winpatu Sanctuary Chilaw 1.075 1.89 27 1.5 1.2 Passengers Winpatu Sanctuary O.77 1.715 29 2 7 1.1 Emply Chilaw Winpatu Sanctuary 0.77 1.715 20 1 1.1 Emply Chilaw Winpatu Sanctuary 0.835 0.66 31 1 7 1.1 Linepty Winpatu Sanctuary 1.76 1.76 33 1 6 1.2 Machines Marawia Chilaw 0.535 0.67 33 1 6 1.2 Machines Minarwiaia	22	2	7	1.2	Empty	Chilaw	Wilpattu Sanctuary	0.58	0.43	
24 1 7 1.1 Empty Winpatu Sanctuary Chilaw 1.04 0.92 25 1 5 1.2 Passengers Winpatu Sanctuary Chilaw 1.04 0.92 26 2 6 1.2 Passengers Chilaw Winpatu Sanctuary 2.28 2.33 27 1.5 1.2 Passengers Chilaw Winpatu Sanctuary 1.02 1.625 29 2 7 1.1 Empty Chilaw Winpatu Sanctuary 1.027 0.555 3.405 30 1 6 1.2 Passengers Chilaw Winpatu Sanctuary 1.027 0.55 3.405 31 1 7 1.1 Livestock Manawewa Chilaw 0.835 0.67 32 1 7 1.1 Empty Chilaw Winpatu Sanctuary 1.26 1.84 33 1.6 1.2 Passengers Chilaw Winpatu Sanctuary 0.435 1.12	23	1	6	1.2	Passengers	Wilnath Sanchusa	Chilaw	0.975	0.62	-
25 1 5 1.2 Passengers Winpatu Sanctuary Chilaw 1.075 1.89 26 2 6 1.2 Passengers Chilaw Winpatu Sanctuary Chilaw 1.075 1.89 27 1 5 1.2 Passengers Winpatu Sanctuary Chilaw 1.32 1.625 28 2 7 1.1 Salt Bags Chilaw Winpatu Sanctuary 0.77 1.715 29 2 7 1.1 Empty Chilaw Winpatu Sanctuary 0.76 1.715 30 1 6 1.2 Passengers Winpatu Sanctuary Chilaw 0.535 0.65 31 1 7 1.1 Livestock Manawia Chilaw 0.835 0.65 33 1 8 1.2 Passengers Chilaw Winpatu Sanctuary 0.48 0.48 34 2 6 1.2 Empty Chilaw Winpatu Sanctuary 0.48 0.82 0.43 35 2 6 1.2 Empty <th< td=""><td>24</td><td>1</td><td>7</td><td>1.1</td><td>Empty</td><td>Wilpattu Sanctuary</td><td>Chilaw</td><td>2.35</td><td>2.85</td><td></td></th<>	24	1	7	1.1	Empty	Wilpattu Sanctuary	Chilaw	2.35	2.85	
25 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 2.28 2.38 27 1 5 1.2 Passengers Wilpattu Sanctuary 2.28 2.38 28 2 7 1.1 Emphy Chilaw Wilpattu Sanctuary 0.77 1.715 29 2 7 1.1 Emphy Chilaw Wilpattu Sanctuary 1.025 0.59 30 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 0.535 0.67 31 1 7 1.1 Emphy Wilpattu Sanctuary 2.16 2.78 33 1 8 1.2 Passengers Chilaw Wilpattu Sanctuary 2.16 2.78 34 2 6 1.2 Emphy Chilaw Wilpattu Sanctuary 0.95 0.45 35 2 7 1.1 Fish/dy Fish Chilaw Wilpattu Sanctuary 0.955 0.49 36	25	1	5	1.2	Passengers	Wilnattu Sanctuary	Chilaw	1.04	0.92	
27 1 5 1.2 Passengers Wilpattu Sanctuary Chilaw 1.22 1.625 28 2 7 1.1 Satt Bags Chilaw Wilpattu Sanctuary 0.77 1.715 30 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.625 3.659 31 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.835 0.657 32 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.835 0.65 33 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 2.76 2.78 34 2 6 1.2 Empty Chilaw Wilpattu Sanctuary 0.435 1.26 35 2 6 1.2 Empty Chilaw Wilpattu Sanctuary 0.435 1.12 0.45 36 2 7 1.1 Fish/dry Fish Chilaw Wilpattu Sanctuary 0.435 0.45 37 2 15 1.1 Water Chilaw	26	2	6	1.2	Passengers	Chilaw	Miloattu Constructu	1.075	1.89	
28 2 7 1.1 Salt Bags Chilaw Winpatt Sanctuary 0.77 1.715 29 2 7 1.1 Empty Chilaw Winpatt Sanctuary 0.77 1.715 30 1 6 1.2 Passengers Winpatt Sanctuary Chilaw 0.535 0.67 31 1 7 1.1 Evestock Mahawewa Chilaw 0.535 0.67 32 1 7 1.4 Empty Winpatt Sanctuary 1.255 1.84 34 2 6 1.2 Passengers Chilaw Winpatt Sanctuary 2.16 2.78 35 2 6 1.2 Engty Chilaw Winpatt Sanctuary 0.435 1.12 0.45 36 2 7 1.1 Empty Chilaw Winpatts Sanctuary 0.435 1.12 0.45 37 2 1 1.1 Empty Chilaw W	27	1	5	1.2	Passengers	Wilnattu Sanctuani	Chilmu	2.28	2.38	
29 2 7 1.1 Empty Empty Chilaw Wilpatu Sanctuary 1.025 0.59 30 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 1.555 3.405 31 1 7 1.1 Livestock Mahawaa Chilaw 0.835 0.67 32 1 7 1.1 Empty Wilpatu Sanctuary Chilaw 0.835 0.667 33 1 6 1.2 Passengers Chilaw Wilpatu Sanctuary 2.16 1.1 Haravia 34 2 6 1.2 Passengers Chilaw Wilpatu Sanctuary 0.87 0.835 35 2 6 1.2 Passengers Chilaw Wilpatu Sanctuary 0.435 1.12 0.45 36 2 7 1.1 Findy Chilaw Wilpatu Sanctuary 0.435 1.12 0.45 37 2 15 1.11 Wilpatu Sanctuary 0.43	28	2	7	1.1	Salt Bags	Chilaw	Wilnothy Conchrony	1.32	1.625	
30 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 1.555 3.405 31 1 7 1.1 Livestock Mahawewa Chilaw 0.535 0.67 32 1 7 1.1 Empty Wilpatu Sanctuary Chilaw 0.835 0.56 33 1 6 1.2 Machines Marawila Chilaw 0.835 0.56 33 1 6 1.2 Passengers Chilaw Wilpatu Sanctuary 1.26 2.78 35 2 6 1.2 Empty Chilaw Wilpatu Sanctuary 0.87 0.835 36 2 7 1.1 Fish/dry Fish Chilaw Wilpatu Sanctuary 0.435 1.12 0.445 39 2 7 1.1 Empty Chilaw Wilpatu Sanctuary 0.995 0.49 40 2 7 1.1 Empty Wilpatu Sanctuary 0.43 2.53	29	2	7	11	Emoty	Chilaw	Wilpattu Sanctuary	1.025	1./15	
31 1 7 1.1 Livestock Manawewa Chilaw 0.535 0.67 32 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.835 0.67 33 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 2.16 2.78 34 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 2.16 2.78 35 2 6 1.2 Ensengers Chilaw Wilpattu Sanctuary 0.835 1.12 0.45 36 2 7 1.1 Field History Chilaw Wilpattu Sanctuary 0.91 0.835 37 2 15 1.1.1 Water Chilaw Wilpattu Sanctuary 0.92 1.45 38 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.92 1.32 40 2 7 1.1 Rice/Paddy Chilaw Wilpattu Sanctuary 0.96 0.635 41 2 6 1.2 Passengers Chilaw	30	1	6	1.2	Passengers	Wilnattu Sanctuary	Chilaw	1.025	3.405	
32 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.835 0.56 33 1 6 1.2 Marawila Chilaw 0.835 0.56 34 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 2.16 2.78 35 2 6 1.2 Empty Chilaw Wilpattu Sanctuary 2.15 1.11 36 2 7 1.1 Fish/dry Fish Chilaw Wilpattu Sanctuary 0.435 1.12 0.45 38 2 8 1.2 Food Items Chilaw Wilpattu Sanctuary 0.435 1.12 0.45 39 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.435 1.32 40 2 7 1.1 Empty Wilpattu Sanctuary 0.435 2.53 41 2 6 1.2 Passengers Wilpattu Sanctuary 0.44 2.65 1.2 Passengers Wilpattu Sanctuary 1.44 3.515 42 1 7 </td <td>31</td> <td>1</td> <td>7</td> <td>11</td> <td>Livestock</td> <td>Mahawewa</td> <td>Chilaw</td> <td>0.535</td> <td>0.67</td> <td></td>	31	1	7	11	Livestock	Mahawewa	Chilaw	0.535	0.67	
33 1 8 1.2 Machines Marawia Chilaw 0.00 <th< td=""><td>32</td><td>1</td><td>Ţ</td><td>1.1</td><td>Empty</td><td>Wilpattu Sanctuary</td><td>Chilaw</td><td>0.335</td><td>0.67</td><td></td></th<>	32	1	Ţ	1.1	Empty	Wilpattu Sanctuary	Chilaw	0.335	0.67	
34 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 2.16 2.78 35 2 6 1.2 Empty Chilaw Wilpattu Sanctuary 1.75 1.965 36 2 7 1.1 Fish/dry Fish Chilaw Milpattu Sanctuary 0.435 1.12 0.435 37 2 15 1.1.1 Wulpattu Sanctuary 0.435 1.12 0.435 38 2 8 1.2 Food Items Chilaw Wilpattu Sanctuary 0.435 1.2 0.45 40 2 7 1.1 Rice/Paddy Chilaw Wilpattu Sanctuary 0.99 1.32 41 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 1.835 2.53 42 1 7 1.1 Einpty Wilpattu Sanctuary Chilaw 2.29 3.48 44 2 5 1.2 Passengers Chilaw 0.56	33	1	6	1.2	Machines	Marawila	Chilaw	1 25	1 84	
35 2 6 1.2 Empty Chilaw Wipattu Sanctuary 1.75 1.965 36 2 7 1.1 Fish/dry Fish Chilaw Mahawewa 0.87 0.835 37 2 15 1.1 Water Chilaw Wilpattu Sanctuary 0.435 1.12 0.445 38 2 8 1.2 Food Items Chilaw Wilpattu Sanctuary 0.955 0.49 40 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.955 0.49 41 2 6 1.2 Passengers Wilpattu Sanctuary 0.956 0.635 43 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 1.835 2.53 44 2 5 1.2 Passengers Chilaw 0.485 0.43 45 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 0.698 0.43 46	34	2	6	1.2	Passengers	Chilaw	Wilnattu Sanctuary	2 16	2.78	
36 2 7 1.1 Fish/dry Fish Chilaw Mahawewa 0.87 0.835 37 2 15 1.1.1 Water Chilaw Wilpattu Sanctuary 0.435 1.12 0.45 38 2 8 1.2 Food Items Chilaw Wilpattu Sanctuary 0.435 1.12 0.45 39 2 7 1.1 Rice/Paddy Chilaw Wilpattu Sanctuary 0.99 1.32 40 2 7 1.1 Rice/Paddy Chilaw Wilpattu Sanctuary 0.99 1.32 41 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 0.80 0.35 42 1 7 1.1 Electrical Goods Weinapuwa Chilaw 0.83 0.43 44 2 5 1.2 Passengers Chilaw 0.80 0.43 47 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.82	35	2	6	1.2	Empty	Chilaw	Wilpattu Sanctuary	1.75	1.965	1
37 2 15 1.1.1 Water Chilaw Wilpattu Sanctuary 0.435 1.12 0.445 38 2 8 1.2 Food Items Chilaw Wilpattu Sanctuary 0.955 0.49 40 2 7 1.1 Rice/Paddy Chilaw Wilpattu Sanctuary 0.955 0.49 41 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 0.995 0.49 42 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.96 0.635 43 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 1.835 2.53 44 2 5 1.2 Passengers Chilaw Wilpattu Sanctuary 1.26 1.84 45 1 6 1.2 Passengers Chilaw 0.689 0.43 46 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.689 0.43 47 1 7 1.1 Empty Wilpattu Sanctuary <td>36</td> <td>2</td> <td>7</td> <td>1.1</td> <td>Fish/dry Fish</td> <td>Chilaw</td> <td>Mahawewa</td> <td>0.87</td> <td>0.835</td> <td></td>	36	2	7	1.1	Fish/dry Fish	Chilaw	Mahawewa	0.87	0.835	
38 2 8 1.2 Food Items Chilaw Wilpattu Sanctuary 1.29 1.45 39 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.955 0.49 40 2 7 1.1 Rice/Paddy Chilaw Wilpattu Sanctuary 0.955 0.49 41 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 1.835 2.53 42 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.96 0.635 43 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary Chilaw 1.84 44 2 5 1.2 Passengers Wilpattu Sanctuary Chilaw 0.86 0.48 45 1 8 1.2 Faitury Foods Wennappuwa Chilaw 0.88 0.48 47 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.885 0.43 <td>37</td> <td>2</td> <td>15</td> <td>1.1.1</td> <td>Water</td> <td>Chilaw</td> <td>Wilpattu Sanctuary</td> <td>0.435</td> <td>1.12</td> <td>0.45</td>	37	2	15	1.1.1	Water	Chilaw	Wilpattu Sanctuary	0.435	1.12	0.45
39 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.995 0.49 40 2 7 1.1 Rice/Paddy Chilaw Wilpattu Sanctuary 0.995 0.49 41 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 1.835 2.53 42 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.96 0.635 42 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 2.23 3.48 44 2 5 1.2 Passengers Chilaw Wilpattu Sanctuary Chilaw 1.64 3.515 46 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.88 0.49 47 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.98 0.82 48 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.945 0.	38	2		12	Food Items	Chilaw	Wilpattu Sanctuary	1.29	1.45	
b 2 7 1.1 Rice/Paddy Chilaw Wilpattu Sanctuary 0.99 1.32 41 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 0.1835 2.53 42 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.96 0.635 43 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.29 3.48 44 2 5 1.2 Passengers Chilaw Wilpattu Sanctuary Chilaw 1.44 3.515 46 1 7 1.1 Elsertical Goods Wilpattu Sanctuary Chilaw 0.680 0.481 47 1 7 1.1 Fish/dry Fish Wilpattu Sanctuary Chilaw 0.885 0.491 48 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.986 0.445 50 1 7 1.1 Empty Chilaw Sanctuary <t< td=""><td>39</td><td>2</td><td>7</td><td>11</td><td>Empty</td><td>Chilaw</td><td>Wilpattu Sanctuary</td><td>0.955</td><td>0.49</td><td></td></t<>	39	2	7	11	Empty	Chilaw	Wilpattu Sanctuary	0.955	0.49	
41 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 1.835 2.53 42 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.96 0.635 43 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.23 3.48 44 2 5 1.2 Passengers Chilaw Wilpattu Sanctuary 1.26 1.84 45 1 6 1.2 Faulty Foods Wennappuwa Chilaw 0.69 0.48 46 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.69 0.48 47 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.885 0.49 48 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.988 0.82 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.905 1.67 51 1 6 1.2 Passengers Wilpattu Sanct	40	2	7	11	Rice/Paddy	Chilaw	Wilpattu Sanctuary	0.99	1.32	
11 2 1 11 Empty Wilpattu Sanctuary Chilaw 0.96 0.635 43 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.29 3.48 44 2 5 1.2 Passengers Chilaw Wilpattu Sanctuary 1.26 1.84 45 1 8 1.2 Faultry Foods Wennappuwa Chilaw 0.69 0.48 46 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.88 0.49 47 1 7 1.1 Einpty Wilpattu Sanctuary Chilaw 0.98 0.82 48 1 7 1.1 Einpty Wilpattu Sanctuary Chilaw 0.945 0.445 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.945 0.445 51 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.96 1.705 52 1 8 1.2 Water Wilpattu Sanctuary	41	2	6	12	Passengers	Chilaw	Wilpattu Sanctuary	1.835	2.53	
1 1	42	-1	7	11	Empty	Wilpattu Sanctuary	Chilaw	0.96	0.635	5
44 2 5 1.2 Passengers Chilaw Wilpattu Sanctuary 1.26 1.84 45 1 8 1.2 Faultry Foods Wennappuwa Chilaw 0.69 0.43 46 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.69 0.43 47 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.885 0.49 48 1 7 1.1 Fish/dry Fish Wilpattu Sanctuary Chilaw 0.98 0.82 48 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.945 0.445 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.055 1.67 51 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.025 0.46 53 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.025 0.46 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 56 2 7	42		6	12	Passengers	Wilpattu Sanctuary	Chilaw	2.29	3.48	
44 2 0 1.12 Foultry Foods Wennappuwa Chilaw 1.44 3.515 45 1 6 1 7 1.1 Electrical Goods Wilpattu Sanctuary Chilaw 0.69 0.48 47 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.885 0.49 48 1 7 1.1 Fish/dry Fish Wilpattu Sanctuary Chilaw 0.98 0.82 49 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.07 2.74 49 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 0.945 0.445 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.96 1.705 51 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.96 1.705 52 1 8 1.2 Water Wilpattu Sanctuary 1.025 0.46 53 2 7 1.1 Empty Chilaw	43		5	12	Passengers	Chilaw	Wilpattu Sanctuary	1.26	1.84	
43 1 0 1.1 Fleetrical Goods Wilpattu Sanctuary Chilaw 0.69 0.48 46 1 7 1.1 Einetrical Goods Wilpattu Sanctuary Chilaw 0.885 0.49 47 1 7 1.1 Fish/dry Fish Wilpattu Sanctuary Chilaw 0.98 0.82 48 1 7 1.1 Fish/dry Fish Wilpattu Sanctuary Chilaw 0.98 0.82 49 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 0.945 0.445 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.945 0.445 51 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.96 1.705 52 1 8 1.2 Water Wilpattu Sanctuary Chilaw 1.96 1.64 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 55 1 15 1.1.1 Water W	44	4	8	12	Faultry Foods	Wennappuwa	Chilaw	1.44	3.515	5
47 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.885 0.49 48 1 7 1.1 Fish/dry Fish Wilpattu Sanctuary Chilaw 0.98 0.82 49 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 0.945 0.445 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.945 0.445 51 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.96 1.705 52 1 8 1.2 Water Wilpattu Sanctuary Chilaw 1.965 1.67 53 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.025 0.46 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 55 1 15 1.1.1 Water Wilpattu Sanctuary	45	1	7	11	Electrical Goods	Wilpattu Sanctuary	Chilaw	0.69	0.48	3
47 1 7 1.1 Fish/dry Fish Wipattu Sanctuary Chilaw 0.98 0.82 49 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.07 2.74 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.945 0.445 51 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.96 1.705 52 1 8 1.2 Water Wilpattu Sanctuary Chilaw 1.965 1.67 53 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.025 0.46 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.69 1.246 1.6 55 1 15 1.1 Water Wilpattu Sanctuary Chilaw 0.69 1.246 1.6 56 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 57 2 8 1.2 Wooden Prod	40			11	Empty	Wilpattu Sanctuary	Chilaw	0.885	0.49	
40 1 6 1.2 Passengers Wipattu Sanctuary Chilaw 2.07 2.74 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.945 0.445 50 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.96 1.705 51 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.505 1.67 52 1 8 1.2 Water Wilpattu Sanctuary Chilaw 1.025 0.46 53 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 2.455 1.54 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 56 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.015 1.415 57 2 8 1.2 Empty Wilpattu Sanctuary 1.03 0.63 <t< td=""><td>4/</td><td></td><td>- 7</td><td>11</td><td>Fish/dry Fish</td><td>Wilpattu Sanctuary</td><td>Chilaw</td><td>0.98</td><td>0.82</td><td>2</td></t<>	4/		- 7	11	Fish/dry Fish	Wilpattu Sanctuary	Chilaw	0.98	0.82	2
49 1 0 1.1 Empty Wilpattu Sanctuary Chilaw 0.945 0.445 50 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.96 1.705 51 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.505 1.67 52 1 8 1.2 Water Wilpattu Sanctuary Chilaw 1.025 0.46 53 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.025 0.46 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.69 1.246 1.64 55 1 15 1.1.1 Water Wilpattu Sanctuary Chilaw 0.63 1.45 56 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.015 1.415 57 2 8 1.2 Empty Wilpattu Sanctuary Chilaw 1.045 0.435 58 1 7 1.1 Empty Chilaw <td< td=""><td>48</td><td></td><td></td><td>12</td><td>Passengers</td><td>Wilpattu Sanctuary</td><td>Chilaw</td><td>2.07</td><td>2.74</td><td>1</td></td<>	48			12	Passengers	Wilpattu Sanctuary	Chilaw	2.07	2.74	1
S0 1 6 1.2 Passengers Wipattu Sanctuary Chilaw 1.96 1.705 52 1 6 1.2 Passengers Wipattu Sanctuary Chilaw 1.505 1.67 53 2 7 1.1 Empty Chilaw Wipattu Sanctuary 1.025 0.46 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 2.455 1.54 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 2.455 1.54 55 1 15 1.1.1 Water Wilpattu Sanctuary 0.69 1.246 1.64 56 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 57 2 8 1.2 Wooden Prod Chilaw Marawila 0.45 0.435 58 1 7 1.1 Food Items Anamaduwa Marawila 0.45 0.435 60 1 7 1.1 Empty Chilaw Wilpattu Sanctuary	49	4	- 7	11	Empty	Wilpattu Sanctuary	Chilaw	0.945	0.445	
51 1 6 1.2 Pasengers Wilpattu Sanctuary Chilaw 1.505 1.67 52 1 8 1.2 Water Wilpattu Sanctuary Chilaw Wilpattu Sanctuary 1.025 0.46 53 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 2.455 1.54 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 2.455 1.54 55 1 15 1.1.1 Water Wilpattu Sanctuary Chilaw 0.69 1.246 1.64 56 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 57 2 8 1.2 Empty Chilaw Wilpattu Sanctuary 1.015 1.415 58 1 7 1.1 Food Items Anamaduwa Marawila 0.45 0.435 58 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 60 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 61 1	50	1		12	Passengers	Wilpattu Sanctuary	Chilaw	1.96	1.705	
32 1 0 11.1 Empty Chilaw Wilpattu Sanctuary 1.025 0.46 53 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 2.455 1.54 54 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 2.455 1.54 55 1 15 1.1.1 Water Wilpattu Sanctuary Chilaw 0.69 1.246 1.64 56 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 57 2 8 1.2 Wooden Prod Chilaw Wilpattu Sanctuary 1.015 1.415 58 1 7 1.1 Food Items Anamaduwa Marawila 0.45 0.435 58 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.03 0.63 60 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 2.065 3.595 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.065 3.595 62 1 <td< td=""><td>51</td><td>- 1</td><td>0</td><td>12</td><td>Water</td><td>Wilpattu Sanctuary</td><td>Chilaw</td><td>1.505</td><td>1.67</td><td></td></td<>	51	- 1	0	12	Water	Wilpattu Sanctuary	Chilaw	1.505	1.67	
33 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 2.455 1.54 54 2 7 1.1 Empty Chilaw O.69 1.246 1.64 55 1 15 1.1.1 Water Wilpattu Sanctuary Chilaw 0.69 1.246 1.64 56 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 57 2 8 1.2 Wooden Prod Chilaw Wilpattu Sanctuary 1.015 1.415 58 1 7 1.1 Food Items Anamaduwa Marawila 0.45 0.435 58 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 60 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.065 3.595 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.05 3.285 62 1 8 1.2 Empty	52			11	Empty	Chilaw	Wilpattu Sanctuan	1.02	0.46	2
34 2 7 1.1 Water Wilpattu Sanctuary Chilaw 0.69 1.246 1.64 55 1 15 1.1.1 Water Wilpattu Sanctuary 0.835 0.435 56 2 7 1.1 Emply Chilaw Wilpattu Sanctuary 0.051 1.415 57 2 8 1.2 Wooden Prod Chilaw Wilpattu Sanctuary 1.015 1.415 58 1 7 1.1 Food Items Anamaduwa Marawila 0.45 0.435 59 1 8 1.2 Emply Wilpattu Sanctuary Chilaw 1.4 1.55 60 1 7 1.1 Emply Chilaw Wilpattu Sanctuary 1.03 0.63 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.05 0.925 62 1 8 1.2 Emply Wilpattu Sanctuary Chilaw 1.05 0.79 64 2 7 1.2 Food Items Chilaw Wilpattu Sanctu	53	2		11	Empty	Chilaw	Wilpattu Sanctuan	2.45	1.54	1 10
55 1 10 1.1 Empty Chilaw Wilpattu Sanctuary 0.835 0.435 56 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.015 1.415 57 2 8 1.2 Wooden Prod Chilaw Wilpattu Sanctuary 1.015 1.415 58 1 7 1.1 Food Items Anamaduwa Marawila 0.45 0.435 59 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 1.4 1.55 60 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.065 3.595 62 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 2.065 0.925 63 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.13 3.285	54	- 4	15	111	Water	Wilpattu Sanctuary	Chilaw	0.69	1.240	1.64
36 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.015 1.415 57 2 8 1.2 Wooden Prod Chilaw Marawila 0.45 0.435 58 1 7 1.1 Food Items Anamaduwa Marawila 0.45 0.435 59 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 1.4 1.55 60 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 60 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.065 3.595 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.05 0.925 62 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 2.13 3.285 63 1 6 1.2 Passengers Wilpattu Sanctuary 1.185 0.79 64 2 7 1.2 Food Items Chilaw Wilpattu Sanctuary 1.33 <td< td=""><td>55</td><td>1</td><td>15</td><td>1.1.</td><td>Empty</td><td>Chilaw</td><td>Wilpattu Sanctuar</td><td>0.83</td><td>0.43</td><td></td></td<>	55	1	15	1.1.	Empty	Chilaw	Wilpattu Sanctuar	0.83	0.43	
57 2 0 1.2 Food Items Anamaduwa Marawila 0.45 0.435 58 1 7 1.1 Food Items Anamaduwa Marawila 0.45 0.435 59 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 1.03 0.63 60 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.065 3.595 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.05 0.925 62 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 2.13 3.285 63 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.185 0.79 64 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.33 0.78 65 2 7 1.2 Food Items Chilaw Chilaw	56	2		12	Wooden Prod	Chilaw	Wilpattu Sanctuar	1.01	1.41	5
38 1 7 1.11 Empty Witpattu Sanctuary Chilaw 1.4 1.55 59 1 8 1.2 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 60 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.03 0.63 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.065 3.595 62 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 1.05 0.925 63 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.05 0.925 63 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.13 3.285 64 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.33 0.78 65 2 7 1.2 Food Items Chilaw Wilpattu Sanctuary 1.155 66 2 7 1.2 Fruits Chilaw Chilaw 1.155 67 1 7 1.1 Empty Wilpattu Sanctuary Chilaw </td <td>57</td> <td>2</td> <td></td> <td>11</td> <td>Food Items</td> <td>Anamaduwa</td> <td>Marawila</td> <td>0.4</td> <td>1 4 5</td> <td>5</td>	57	2		11	Food Items	Anamaduwa	Marawila	0.4	1 4 5	5
59 1 0 1.12 Chipy Chilaw Wilpattu Sanctuary 1.03 0.03 60 1 7 1.1 Empty Chilaw Wilpattu Sanctuary Chilaw 2.065 3.595 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.05 0.925 62 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 2.13 3.285 63 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.13 3.285 64 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.185 0.79 64 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.33 0.78 65 2 7 1.2 Food Items Chilaw Chilaw 0.87 1.155 66 2 7 1.2 Fruits Chilaw Chilaw 1.85 3.325 67 1 7 1.1 Empty Wilpattu Sanctuary Chila	58	1		12	Empty	Wilpattu Sanctuary	Chilaw	1.4	1.0	
60 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 2.083 3.335 61 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.05 0.925 62 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 1.05 0.925 63 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.13 3.285 64 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.185 0.79 64 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.33 0.78 65 2 7 1.2 Food Items Chilaw Chilaw 0.87 1.155 66 2 7 1.2 Fruits Chilaw Chilaw 1.18 0.795 67 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.185 0.795 68 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.955 3.325 69 1 6 1.2 Passengers Wilp	59		0	1.4	Empty	Chilaw	Wilpattu Sanctuar	1.0.	5 2 50	5
61 1 0 1.21 Empty Wilpattu Sanctuary Chilaw 1.05 0.925 62 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 2.13 3.285 63 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.13 3.285 63 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 1.185 0.79 64 2 7 1.1 Empty Chilaw Wilpattu Sanctuary 1.185 0.79 65 2 7 1.2 Food Items Chilaw Wilpattu Sanctuary 1.155 66 2 7 1.2 Fruits Chilaw Chilaw 1.18 0.795 67 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.955 3.325 68 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545 69 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545	60			12	Passengers	Wilpattu Sanctuary	Chilaw	2.00	5 0 02	5
62 1 0 1.2 Passengers Wilpattu Sanctuary Chilaw 2.13 3.235 63 1 6 1.2 Passengers Wilpattu Sanctuary 1.185 0.79 64 2 7 1.1 Emply Chilaw Wilpattu Sanctuary 1.33 0.78 65 2 7 1.2 Food Items Chilaw Chilaw 0.87 1.155 66 2 7 1.2 Fruits Chilaw Chilaw 0.87 1.155 67 1 7 1.1 Emply Wilpattu Sanctuary Chilaw 1.955 3.325 68 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545 69 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545	61	1	6	1.2	Empty	Wilpattu Sanctuary	Chilaw	1.0	3 3 28	5
63 1 0 1.11 Empty Chilaw Wilpattu Sanctuary 1.183 0.73 64 2 7 1.11 Empty Chilaw Wilpattu Sanctuary 1.33 0.78 65 2 7 1.2 Food Items Chilaw Chilaw 0.87 1.155 66 2 7 1.2 Fruits Chilaw Chilaw 0.87 1.155 67 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.955 3.325 68 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.505 4.545 69 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.505 4.545	62	1	8	12	Passengers	Wilpattu Sanctuary	Chilaw	2.1.	5 0 7	9
64 2 7 1.1 Entry Wilpattu Sanctuary 1.33 0.10 65 2 7 1.2 Food Items Chilaw Chilaw 0.87 1.155 66 2 7 1.2 Fruits Chilaw Chilaw 0.87 1.155 66 2 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.88 0.795 67 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.955 3.325 68 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545 69 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545	63	1	0	1.4	Empty	Chilaw	Wilpattu Sanctuar	4 2	3 07	8
65 2 7 1.2 Fruits Chilaw Chilaw 0.07 1.130 66 2 7 1.2 Fruits Chilaw Chilaw 1.18 0.795 67 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.955 3.325 68 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545 69 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545	64	2		10	Eood Items	Chilaw	Wilpanu Sanciual	1.3	7 1 15	5
66 2 7 1.2 Provide 1.18 0.793 67 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.955 3.325 68 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.955 3.325 69 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545	65	_2		1.2	Fruits	Chilaw	Chilaw	0.0	0 79	5
67 1 7 1.1 Chipy Wilpattu Sanctuary Chilaw 1.933 3.323 68 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545 69 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 2.585 4.545	66	2	7	1.2	Empty	Wilpattu Sanctuary	Chilaw	1.05	5 3 32	5
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69 1 6 1.2 Passenger	68	1	6	1.2	Passengers	Wilpattu Sanctuary	Chilaw	2.30	0 4.04	
	69	1	6	1.2	I assengere					

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41.

70	2 8	1.2	Food Items					
72	$\frac{2}{1}$ $\frac{7}{7}$	1.1	Empty	Madampe (Chi)	Wilpattu Sanctuary	3.22	6.65	
73	1 8	12	Empty	Wilpattu Sanctuary	Chilaw	1.24	0.83	
74	2 8	1.2	Grocenes	Wilmattu Sanctuary	Chilaw	0.69	0.79	
75	1 7		Fish/dry Fish	Chilaw Chilaw	Chilaw	1.375	1.18	
76	1 7	1.1	Tea	Nattandi	Wennappuwa	1.705	2.11	
77	1-4	1.1	Empty	Willust 0	Puttalam	0.92	1.04	
78	1	1.1	Empty	Willoattu Sanctuary	Chilaw	0.87	1.63	
70	2	1.1	Empty	Wilson Sanctuary	Chilaw	1.01	0.575	
00	4 6	1.2	Passengers	Chile Sanctuary	Chilaw	0.87	0.58	
00	1 7	1.1	Fish/dry Fish	Chilaw	Wilpattu Sanctuary	2.32	3.275	
81	1 5	1.2	Passengers	Negombo	Chilaw	0.505	0.67	
82	1 7	1.1	Food Items	Wilpattu Sanctuary	Chilaw	1.345	2.34	
Note:				Invitpattu Sanctuary	Chilaw	1.335	0.85	

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Direction : 1- Chillaw 2- Iranawila

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NO TYPE CONING LGAD ORIG DEST AxLE1 AXLE1 AXLE2 AXLE2 AXLE3	Sr	DID	VEH	AXIE		10 Dewalahandiya					
Image: Control ORIG DEST Adde Load 2 2 6 1.2 Passengers Wijnelitu Sanctuary Chilaw Adde Load Adde Load 4 1 8 1.2 Passengers Wijnelitu Sanctuary Chilaw Wijnelitu Sanctuary Chilaw 3.825 5 1 6 1.2 Passengers Wijnelitu Sanctuary Chilaw 3.652 5.456 6 1.1 7 1.7 1.7 1.7 1.7 1.7 1.85 1.355 7 1.7 1.7 1.1 Fruits Wipettu Sanctuary Chilaw 3.65 5.454 8 1.7 1.1 Fruits Wipettu Sanctuary 1.85 5.455 1.835 10 2.6 1.2 Passengers Chilaw 3.65 5.151 11 1.6 1.2 Passengers Chilaw 3.65 5.141 11 1.6 1.2 Passengers Chilaw 3.651 1.	NO	Dire	TYPE	CONFIC	LOAD						
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3 1 2 12 Model Production Might Sanctuary 2.75 3.825 5 1 6 1.2 Ency Might Sanctuary 2.75 3.825 6 1.6 1.2 Ency Might Sanctuary Chilaw 3.86 6.2 6 1.6 1.2 Ency Might Sanctuary Chilaw 3.655 6.545 7 1.7 1.1 Fruits Might Sanctuary Chilaw 3.655 6.545 8 1.7 1.1 Ency Might Sanctuary Might Sanctuary 1.65 1.835 10 2.6 1.2 Passengers Kururegala Chilaw 3.15 5.515 11 1.6 1.2 Emply Wipatu Sanctuary 2.76 4.335 12 1.7 1.8 1.2 Emply Wipatu Sanctuary Andampe (Chilaw 3.8 5.16 14 1.8 1.6 1.2 Emply Wipatu Sanctuary Might Sanctuary	2	2	6	12	assengers	Wilnattu Canatur		AALET	AXLE2	AXLE3	
4 1 2 Model Prod Wingatu Sanctuary Chiaw 38 6.2 5 1 6 1.2 Passengers Wingatu Sanctuary Chiaw 38 6.2 7 1 7 1.1 Finity Wingatu Sanctuary Chiaw 3.65 6.545 7 1.7 1.1 Finity Wingatu Sanctuary Chiaw 3.85 1.835 9 2 8 1.2 Finity Wingatu Sanctuary Chiaw 1.85 1.835 9 2 8 1.2 Empty Wingatu Sanctuary Chiaw 1.85 1.835 10 2 6 1.2 Passengers Chiaw Wingatu Sanctuary Chiaw 3.85 5.515 11 1 1.2 Passengers Wingatu Sanctuary Chiaw 1.055 0.445 14 1 8 1.2 Empty Wingatu Sanctuary Chiaw 1.35 1.41 1 1.2 Passengers Wingatu Sanctuary Chiaw 1.35 1.41 1	3	1	Q	1.2	Passengers	Chilaw Chilaw	Chilaw	2.6	34		
5 1 0 1.2 Emply Unitable Stanctuary Chilaw 3.8 0.6 6 1.2 Empsy Winstu Sanctuary Chilaw 3.655 6.555 7 1.7 1.7 Filliam Sanctuary Chilaw 3.655 6.555 8 1.7 1.1 Emply Wingatu Sanctuary Chilaw 1.851 1.835 9 2.8 1.2 Emply Wingatu Sanctuary 1.991 1.635 10 2.6 1.2 Emply Wingatu Sanctuary 1.991 1.635 11 1.6 1.2 Emply Wingatu Sanctuary 1.981 5.515 13 1.6 1.2 Emply Wingatu Sanctuary 1.635 1.41 15 1.6 1.2 Emply Wingatu Sanctuary 1.635 1.41 15 1.6 1.2 Emply Wingatu Sanctuary 1.615 1.41 15 1.6 1.2 Emply Wingatu Sanct	4	1		1.2	Wooden Prod	Million	Wilpattu Sanctuary	2 75	3 825		
2 1 6 1.2 Pasengers Willatt Sanctuary Onliaw 1.63 1.4 7 1 7 1.1 Finds Wingett Sanctuary Onliaw 3.655 6.645 8 1 7 1.1 Finds Wingett Sanctuary Onliaw 3.655 6.645 9 2 8 1.2 Empty Wingett Sanctuary Onliaw 3.655 6.645 10 2 6 1.2 Pasengers Chilaw Wingett Sanctuary 1.655 1.445 11 1 1.2 Empty Wingett Sanctuary Onliaw 3.8 5.515 12 1 6 1.2 Empty Wingett Sanctuary Chilaw 1.055 0.445 14 1 8 1.2 Empty Wingett Sanctuary Chilaw 1.055 0.445 14 1 8 1.2 Empty Wingett Sanctuary 0.645 1.41 15 1 8 1.2 Empty Wingett Sanctuary 0.645 1.52 16<	5		0	1.2	Empty	VVII attu Sanctuary	Chilaw	20	5.025		
6 1 8 12 Empty Mineatu Sancuary Initial 1.059 1.315 7 1.1 Empty Wilpatu Sancuary Minewangoda 1.63 1.835 9 2 8 1.2 Empty Battul concuary Minewangoda 1.67 1.835 10 2 6 1.2 Passengers Wilpatu Sanctuary 1.99 1.635 11 1 6 1.2 Passengers Kurunegaia Chilaw 1.055 0.445 12 1.7 1.1 Empty Wilpatu Sanctuary Nilpatu Sanctuary 1.655 1.445 13 1 8 1.2 Empty Wilpatu Sanctuary Kirankell 1.15 14 1 8 1.2 Empty Wilpatu Sanctuary Kirankell 1.15 15 1.2 Empty Wilpatu Sanctuary Kirankell 1.15 1.15 16 1.2 Passengers Wilpatu Sanctuary Kalanyo 1.45	<u> </u>	1	6	1.2	Passenger	Will attu Sanctuary	Chilaw	3.0	0.2		
7 1 7 1.1 Emply Wipatu Sancuary Chiaw 1.65 1.835 9 2 7.1.1 Emply Batula Org Wipatu Sancuary 1.13 0.07 10 2 6 1.2 Pasengers Chiaw 1.30 0.07 11 1.6 1.2 Pasengers Chiaw Wipatu Sancuary 1.99 1.635 12 1.7 1.1 Emply Wipatu Sancuary Chiaw 3.85 5.15 13 1.8 1.2 Emply Wipatu Sancuary Chiaw 3.85 5.14 14 1.8 1.2 Emply Wipatu Sancuary Chiaw 1.05 0.445 15 1.8 1.6 1.2 Emply Wipatu Sancuary Chiaw 1.71 1.55 1.14 16 1.8 1.6 1.2 Pasengers Wipatu Sancuary 1.71 1.55 1.71 1.55 1.71 1.55 1.71 1.55 1.71 1.55 1.71 1.55 1.71 1.55 1.71 1.55 1.51 <td>0</td> <td>1</td> <td>8</td> <td>12</td> <td>Emote</td> <td>Wilpattu Sanctuary</td> <td>Chilaw</td> <td>1.095</td> <td>1.315</td> <td></td>	0	1	8	12	Emote	Wilpattu Sanctuary	Chilaw	1.095	1.315		
8 1 7 1.1 Finite Wiestu Sanctaary Unitwengoda 1.65 1.835 10 2 8 1.2 Empty Battula Og Wilpatu Sanctaary Thiswengoda 1.67 1.835 10 2 6 1.2 Passengers Kurunggala Wilpatu Sanctaary 3.755 4.335 11 1 6 1.2 Passengers Chiaw 1.055 0.445 13 1 8 1.2 Empty Winatu Sanctary Pailua Og 1.685 1.41 14 1 8 1.2 Empty Winatu Sanctary Chiaw 1.30 0.85 15 1 2 1.2 Empty Winatu Sanctary Chiaw 1.30 0.855 18 1 1.2 Passengers Winatu Sanctary Chiaw 1.71 1.55 21 2 1.2 Pasterpers Winatu Sanctary Chiaw 3.45 5.45 22 1 </td <td>7</td> <td>1</td> <td>7</td> <td>14</td> <td>End</td> <td>Wilpattu Sanctuan</td> <td>Chilew</td> <td>3.655</td> <td>6.545</td> <td></td>	7	1	7	14	End	Wilpattu Sanctuan	Chilew	3.655	6.545		
9 2 1 1 Emply Winstu Sanctuary Onlaw 13 0.97 10 2 6 1.2 Passengers Chilaw 13 0.97 11 1 6 1.2 Passengers Chilaw Wilpatu Sanctuary 1.99 1.635 12 1 7 1.1 Emply Winatu Sanctuary Chilaw 3.8 5.515 13 1 8 1.2 Emply Winatu Sanctuary Chilaw 1.055 0.445 14 1 8 1.2 Emply Winatu Sanctuary Chilaw 1.055 0.445 14 1 8 1.2 Emply Winatu Sanctuary Chilaw 1.11 1.51 15 1 6 1.2 Emply Winatu Sanctuary Chilaw 1.30 0.855 20 1.8 1.6 1.2 Pasengers Winatu Sanctuary Chilaw 4.23 5.43 21 8	8	1	7		FILITS	Wilpattu Sancturary	CURISW	1.85	1.835		
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10 2 6 1.2 Passengers Default Uya Wilpattu Sanctuary 1.96 1.635 11 1 6 1.2 Passengers Kurunegala Chilaw 3.755 4.335 12 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 1.055 0.445 13 1 8 1.2 Empty Wilpattu Sanctuary Madampe (Chi) 3.01 7.12 14 1 8 1.2 Empty Wilpattu Sanctuary Madampe (Chi) 3.01 7.12 15 1 8 1.2 Empty Wilpattu Sanctuary Chilaw 1.38 1.58 1.15 16 1.2 Empty Wilpattu Sanctuary Chilaw 4.23 5.43 20 1.8 1.2 Food Items Wilpattu Sanctuary Wenagpuwa 2.05 4.55 21 2 8 1.2 Posite Product Chilaw Katupotha 1.47 2.66 22 1 9 1.2 Empty Wilpattu Sanctuary 0.845 5.55 </td <td>10-</td> <td>- 4</td> <td>8</td> <td>1.2</td> <td>Empty</td> <td>Partic Sanctuary</td> <td>Chilaw</td> <td>1.13</td> <td>0.97</td> <td></td>	10-	- 4	8	1.2	Empty	Partic Sanctuary	Chilaw	1.13	0.97		
11 1 6 12 Passengers Kurunegala Chilaw 3755 4.335 13 1 8 1.1 Emply Witpattu Sanctuary Chilaw 3.8 5.515 14 1 8 1.2 Emply Witpattu Sanctuary Materiam 1.655 1.441 15 1.8 1.2 Emply Witpattu Sanctuary Kiryankalli 1.55 1.441 16 1.2 Emply Witpattu Sanctuary Kiryankalli 1.581 1.41 16 1.2 Emply Witpattu Sanctuary Chilaw 1.33 0.855 18 1 6 1.2 Food Items Witpattu Sanctuary Chilaw 4.23 4.35 21 9 1.2 Food Items Witpattu Sanctuary Chilaw 3.54 3.045 22 1.9 1.2 Food Items Witpattu Sanctuary Chilaw 3.55 0.53 23 2 7 1.1 Emply Witpattu Sanctuary 0.765 0.53 24 1 7 <td< td=""><td>10</td><td>2</td><td>6</td><td>1.2</td><td>Passengers</td><td>Dattulu Oya</td><td>Wilpattu Sanctuary</td><td>1 99</td><td>1 635</td><td></td></td<>	10	2	6	1.2	Passengers	Dattulu Oya	Wilpattu Sanctuary	1 99	1 635		
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1 1 Emply Wildatu Sanctuary 0.18 3.8 3.15 14 1 8 1.2 Emply Wildatu Sanctuary Maturu Gya 1.685 1.41 15 1.8 1.2 Emply Wildatu Sanctuary Kiryankalii 1.685 1.41 16 1.8 1.2 Emply Wildatu Sanctuary Kiryankalii 1.685 1.41 16 1.8 1.2 Emply Wildatu Sanctuary Chilaw 1.33 0.855 18 1 6 1.2 Food Items Wildatu Sanctuary Chilaw 4.23 4.35 20 1 8 1.2 Food Items Wildatu Sanctuary Wenappuwa 2.27 4.815 21 9 1.2 Emply Wildatu Sanctuary Chilaw 3.54 3.65 22 1 9 1.2 Emply Wildatu Sanctuary Chilaw 3.54 3.65 21 2 8 1.2 Emply Wildatu Sanctuary Chilaw 3.55 3.65 22 <t< td=""><td>12</td><td>1</td><td>7</td><td>1 4</td><td>Tassengers</td><td>Kurunegala</td><td>Chilaw</td><td>3.135</td><td>4.335</td><td></td></t<>	12	1	7	1 4	Tassengers	Kurunegala	Chilaw	3.135	4.335		
1 0 1.2 Empty Witestu Sanctuary Databu 1055 0.445 15 1 8 1.2 Empty Witestu Sanctuary Madampe (Ch) 3.01 7.12 16 1 8 1.2 Empty Witestu Sanctuary Chilaw 1.58 1.15 17 1 8 1.2 Empty Witestu Sanctuary Chilaw 1.33 0.855 18 1 6 1.2 Passengers Witestu Sanctuary Chilaw 1.33 0.855 20 1 8 1.2 Food Items Witestu Sanctuary Wenappuwa 2.06 4.55 21 2 8 1.2 Plastic Product Chilaw Katupotha 1.47 2.66 22 1 9 1.2 Empty Witestu Sanctuary Chilaw 3.54 3.045 23 2 7 1.1 Empty Witestu Sanctuary Chilaw 1.35 2.66 24 1 7 1.3 Empty Witestu Sanctuary Chilaw 1.37	13	1			Empty	Wilpattu Sanctuary	Chilaw	3.8	5.515		
14 1.2 Bricks Wipstite Sanctuary Matter Sanctuary </td <td>14</td> <td></td> <td>0</td> <td>1.2</td> <td>Empty</td> <td>Wilnattu Sancturary</td> <td>Onliaw</td> <td>1.055</td> <td>0.445</td> <td></td>	14		0	1.2	Empty	Wilnattu Sancturary	Onliaw	1.055	0.445		
1 8 1.2 Empty Mipatu Sanctuary Miryankalii 1.58 1.15 17 1 8 1.2 Empty Wipatu Sanctuary Chilaw 1.33 0.855 18 1.6 1.2 Passengers Wipatu Sanctuary Chilaw 1.33 0.855 19 1 8 1.2 Pood Items Wipatu Sanctuary Wenrappuwa 2.05 4.55 20 1 8 1.2 Pood Items Wipatu Sanctuary Wenrappuwa 2.02 4.85 21 2 8 1.2 Plastu Product Chilaw Katupotha 1.47 2.66 22 1 1.1 Empty Wipatu Sanctuary Ohlaw 0.843 0.65 0.545 23 2 7 1.1 Empty Katupotha 0.843 0.65 0.545 24 1 7 1.1 Empty Katupotha 0.843 0.65 0.545 25 2 8 1.2 Ruborin Datulu Sanctuary 0.843 0.65 0.53	14		8	1.2	Bricks	Inclusive Sanctuary	Battulu Oya	1.685	1.41		
16 1 2 Emply Wipatu Sanctuary Kinyankalii 158 1.15 17 1 8 1.2 Emply Wipatu Sanctuary Chilaw 1.33 0.855 19 1 8 1.2 Food Items Wipatu Sanctuary Chilaw 4.23 5.43 20 1 8 1.2 Food Items Wipatu Sanctuary Wenrappuwa 2.05 4.55 21 2 8 1.2 Food Items Wipatu Sanctuary Wenrappuwa 2.27 4.815 22 1 9 1.2 Emply Wipatu Sanctuary Chilaw 3.54 3.045 23 2 7 1.1 Emply Wipatu Sanctuary 0.805 0.53 24 1 7 1.1 Emply Wipatu Sanctuary 0.805 0.53 25 2 8 1.2 Passengers Chilaw Wipatu Sanctuary 0.835 2.61 26 1.2 Passengers Chilaw Wipatu Sanctuary 0.735 0.495 27 <td< td=""><td>15</td><td>1</td><td>8</td><td>1.2</td><td>Empty</td><td>Mipallo Sanctuary</td><td>Madampe (Chi)</td><td>3.01</td><td>7.12</td><td></td></td<>	15	1	8	1.2	Empty	Mipallo Sanctuary	Madampe (Chi)	3.01	7.12		
1 1	16	1	8	12	Empty	wupattu Sanctuary	Kiriyankalli	1.58	1.15		
1 1	17	1	8	10	Emply	Wilpattu Sanctuary	Chilaw	1 33	0.855		
1 1 1.2 Passengers Wilpattu Sanctuary Chilaw 4.23 5.43 20 1 8 1.2 Food Items Wilpattu Sanctuary Wennappuwa 2.05 4.55 21 2 8 1.2 Floating Product Chilaw Katupotha 1.47 2.68 21 9 4.2 Empty Wilpattu Sanctuary Ones 3.43 3.445 23 2 7 1.1 Empty Wilpattu Sanctuary Ones 0.0545 24 1 7 1.1 Empty Wilpattu Sanctuary Ones 0.545 25 2 8 1.2 Empty Katupotha Bathul Oya 1.37 1.39 26 1 7 Assengers Wilpattu Sanctuary Chilaw 0.765 0.495 27 1 8 1.2 Motor Spare Parts Wilpattu Sanctuary Chilaw 1.73 2.095 28 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 1.73 2.095 29 <td>18</td> <td>1</td> <td></td> <td>1.2</td> <td>Empty</td> <td>Wilpattu Sanctuary</td> <td>Chilaw</td> <td>1 71</td> <td>1.50</td> <td></td>	18	1		1.2	Empty	Wilpattu Sanctuary	Chilaw	1 71	1.50		
1 8 1.2 Food Items Wingatu Sanctuary Uman 4.2 5.43 20 1 8 1.2 Plastic Product Chilaw Katupotha 2.05 4.55 21 2 8 1.2 Plastic Product Chilaw Katupotha 1.47 2.68 21 9 1.2 Empty Wilpatu Sanctuary Chilaw 3.54 3.045 23 2 7 1.1 Empty Chilaw Wilpatu Sanctuary 0.805 0.545 24 1 7 1.1 Empty Chilaw Wilpatu Sanctuary 1.935 2.61 25 2 8 1.2 Passengers Chilaw Wilpatu Sanctuary Chilaw 0.765 0.53 26 1 1.2 Empty Katupotha Batulu Oya 1.37 1.39 28 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 1.81 1.355 31 2 7 1.1 Food Items Yulpatu Sanctuary Chilaw 1.81 1.355	10		0	1.2	Passengers	Wilpattu Sanctuary	Chilaw	1.71	1.59	_	
20 1 8 1.2 Food Items Wingatu Sanctuary Wennappuwa 2.05 4.55 21 2 8 1.2 Plastic Product Chilaw Katupotha 1.47 2.68 22 1 9 1.2 Empty Wilpatu Sanctuary Chilaw 1.47 2.68 23 2 7 1.1 Empty Chilaw Wilpatu Sanctuary 0.805 0.545 24 1 7 1.1 Empty Chilaw Wilpatu Sanctuary 0.805 0.545 25 2 8 1.2 Rubber/Rubber Prd Chilaw Wilpatu Sanctuary 0.845 6.848 27 1 8 1.2 Empty Katupotha Bathul Oya 1.37 1.39 28 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 0.765 0.495 30 1 8 1.2 Empty Katupotha 1.73 1.295 31 2 8 1.2 Cood Items Dummalasuriya Katupotha 1.765 0.495	19	1	8	1.2	Food Items	Wilnattu Sanctuary	Villew	4.23	5.43		
21 21 8 1.2 Plastic Product Chilaw Katupotha 1.47 2.68 23 2 7 1.1 Empty Wilpattu Sanctuary Chilaw 3.54 3.045 24 1 7 1.1 Empty Chilaw Wilpattu Sanctuary 0.085 0.545 25 2 8 1.2 Rubber/Rubber Pro Chilaw Wilpattu Sanctuary 1.935 2.61 26 2.6 1.2 Passengers Chilaw Wilpattu Sanctuary 1.935 2.61 27 1 8 1.2 Empty Katupotha Battulu Cya 1.37 1.39 28 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 0.765 0.485 30 1 8 1.2 Most Passengers Wilpattu Sanctuary Chilaw 1.81 1.355 31 2 8 1.2 Food Items Dumbassengers Chilaw 1.76 0.72	20	_ 1	8	1.2	Food Items	11/10 attu Sanctuary	wennappuwa	2.05	4.55		
22 1 9 1.2 Chilaw Katupotha 1.47 2.68 23 2 7 1.1 Empty Chilaw Wipatu Sanctuary Ohlaw 0.805 0.545 24 1 7 1.1 Empty Chilaw Wipatu Sanctuary 0.805 0.545 25 2 8 1.2 Rubber/Rubber Prd Chilaw Wipatu Sanctuary 1.935 2.61 25 2 8 1.2 Rubber/Rubber Prd Chilaw Wipatu Sanctuary 1.935 2.61 26 1 2 Passengers Wipatu Sanctuary Chilaw 4.27 6.26 29 1 7 1.1 Empty Katupotha 1.73 1.39 30 1 8 1.2 Motor Spare Parts Wipatu Sanctuary Chilaw 1.105 0.72 31 2 6 1.2 Prool Items Dummalasuriya Katupotha 0.73 0.595 33 1 7	21	2	8	12	Plastic Dradiet	Sanctuary	Wennappuwa	2.27	4.815		
23 27 1.1 Empty Chilaw 3.54 3.045 24 1 7 1.1 Empty Chilaw Wipatu Sanctuary Chilaw 0.805 0.53 25 2 8 1.2 Rubber/Rubber Prd Chilaw Wipatu Sanctuary 1.935 2.61 26 2.6 1.2 Passengers Chilaw Wipatu Sanctuary 1.935 2.61 27 1 8 1.2 Empty Katupotha Bathul Oya 1.37 1.39 28 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 4.27 6.26 30 1 8 1.2 Motor Spare Parts Wilpatu Sanctuary Chilaw 4.27 6.26 30 1 8 1.2 Motor Spare Parts Wilpatu Sanctuary Chilaw 1.73 2.095 31 2 7 1.1 Food Items Dumalasuitya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Katupotha 2.025 1.93 34 2 6 1.2 Pool Items Palugassegama Katupot	22	1		1.4	Plastic Product	Chilaw	Katupotha	1.47	2.68		
24 1 1.1 Empty Chilaw Wipatu Sanctuary 0.805 0.545 25 2 8 1.2 Rubber/Rubber Pr Chilaw Wipatu Sanctuary 0.805 0.545 26 2 6 1.2 Passengers Chilaw Wipatu Sanctuary 1.935 2.61 27 1 8 1.2 Empty Katupotha Batulu Oya 1.37 1.39 28 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 4.27 6.26 29 1 7 1.1 Empty Katupotha Batulu Oya 1.37 1.39 30 1 8 1.2 Passengers Wilpatu Sanctuary Chilaw 0.765 0.495 31 2 8 1.2 Plastic Product Batulu Oya Katupotha 1.73 2.059 32 2 7 1.1 Food Items Dummalasuriya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Katupotha 1.055	22		- 3	1.2	Empty	Wilpattu Sanctuary	Chilaw	3.54	3 045	_	
24 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.763 0.603	23	2	7	1.1	Empty	Chilaw	Wilnath Sanchung	0.005	0.545		
25 2 8 1.2 Rubber/Rubber Prc Chilaw 0.785 0.785 0.53 26 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 3.845 4.68 28 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 3.845 4.68 28 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 4.27 6.26 29 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.765 0.495 30 1 8 1.2 Plastic Product Batulu Oya Katupotha 1.73 2.095 31 2 8 1.2 Food Items Durmalasutya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Katupotha 2.085 2.68 34 2 8 1.2 Cood Items Palugassegama Katupotha 3.935 5.695 35 1 8 1.2 Cood Items Palugassegama Katupotha 3.935 5.695 36 2 6 1.2 Passengers	_24	1	7	1.1	Empty	Wilnattu Sanchuan	Chilew	0.005	0.545		
26 2 6 1.2 Passengers Chilaw Whipatti Sanctuary 1.335 2.61 27 1 8 1.2 Passengers Whipatti Sanctuary 3.845 4.68 28 1 6 1.2 Passengers Whipatti Sanctuary Chilaw 4.27 6.26 30 1 6 1.2 Passengers Whipatti Sanctuary Chilaw 4.27 6.26 30 1 6 1.2 Passengers Whipatti Sanctuary Chilaw 4.27 6.26 30 1 8 1.2 Empty Wilpatti Sanctuary Chilaw 1.81 1.355 31 2 6 1.2 Picot Items Durmalasutiya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Katupotha 2.085 2.68 33 1 7 1.2 Empty Katupotha Katupotha 3.395 5.695 34 2 6 1.2 Picod Items Palugassegama Katupotha 3.	25	2	8	12	Rubber/Rubber Pre	Chilow	Unitaw	0.785	0.53		
27 1 8 1.2 Empty Katupotha Battulu Oya 1.37 1.39 28 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 4.27 6.26 29 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.765 0.495 30 1 8 1.2 Plastic Product Battulu Oya Katupotha 1.73 2.095 31 2 6 1.2 Plastic Product Battulu Oya Katupotha 0.73 0.595 32 2 7 1.1 Food Items Dummalasutiya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Chilaw 1.05 0.72 34 2 8 1.2 Concrete Beams Palugassegama Katupotha 2.085 2.68 35 1 8 1.2 Pood Items Palugassegama Katupotha 3.395 5.695 36 2 8 1.2 Concrete Beams Palugassegama <	26	2	6	1 2	Recorden Aubuer Pro	Chuaw	Wilpattu Sanctuary	1.935	261		
27 1 6 1.2 [Empty Katupotha Batulu Oya 1.37 1.38 29 1 7 1.1 [Empty Wilpatu Sanctuary Chilaw 0.765 0.495 30 1 8 1.2 Plastic Product Batulu Oya Katupotha 1.75 0.495 31 2 8 1.2 Plastic Product Batulu Oya Katupotha 0.73 0.595 33 1 7 1.1 Food Items Dummalasuriya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Chilaw 1.05 0.72 34 2 6 1.2 Food Items Palugassegama Katupotha 2.085 2.68 35 1 8 1.2 Concrete Beams Palugassegama Katupotha 1.055 1.69 36 2 6 1.2 Porcette Beams Palugassegama Katupotha 3.395 5.695 37 2 6 1.2 Porcette Beams Palugassegama Katupotha 3.395 5.695 38 1 6 1.2 Pass	27	4		1.2	Fassengers	Chilaw	Wilpattu Sanctuary	3.845	4.68		
28 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 4.27 6.26 29 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.765 0.495 30 1 8 1.2 Motor Spare Parts Wilpattu Sanctuary Chilaw 1.81 1.355 31 2 8 1.2 Plastic Product Battulu Oya Katupotha 1.73 2.095 32 2 7 1.1 Food Items Dummalasuriya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Chilaw 1.105 0.72 34 2 8 1.2 Livestock Katupotha Katupotha 2.085 2.68 35 1 8 1.2 Passengers Chilaw Katupotha 3.395 5.695 36 2 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 37 2 6 1.2 Passengers Chilaw Katupotha 1.355 0.78 38 1 6 1.2 Passengers <t< td=""><td>21</td><td></td><td>8</td><td>1.2</td><td>Empty</td><td>Katupotha</td><td>Battulu Oya</td><td>1.37</td><td>1.39</td><td></td></t<>	21		8	1.2	Empty	Katupotha	Battulu Oya	1.37	1.39		
29 1 7 1.1 Empty Wilpattu Sanctuary Chilaw 0.766 0.485 30 1 8 1.2 Motor Spare Parts Wilpattu Sanctuary Chilaw 1.81 1.355 31 2 8 1.2 Plastic Product Battulu Oya Katupotha 1.73 2.095 33 1 7 1.2 Empty Katupotha Chilaw 1.105 0.72 34 2 8 1.2 Food Items Palugassegama Katupotha 2.085 2.88 35 1 8 1.2 Livestock Katupotha Katupotha 1.055 0.595 36 2 8 1.2 Concrete Beams Palugassegama Katupotha 1.655 1.69 37 2 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Poduct Arachchkattuwa Kurunegala 1.985 2.75 40 7 1.2 Empty Katupotha Chilaw 3.41 4.305 42 6 1.2 Passengers Chilaw Sol 5.0	28	1	6	1.2	Passengers	Wilpattu Sanctuary	Chilaw	4 27	6.26		
30 1 8 1.2 Motor Spare Parts Wilpatu Sanctuary Chilaw 1.81 1.355 31 2 8 1.2 Plastic Product Battulu Oya Katupotha 1.73 2.095 32 2 7 1.1 Food Items Dummalasuriya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Chilaw 1.105 0.72 34 2 8 1.2 Food Items Palugassegama Katupotha 2.085 2.68 35 1 8 1.2 Concrete Beams Palugassegama Katupotha 3.395 5.695 36 2 8 1.2 Concrete Beams Palugassegama Katupotha 3.395 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 1.395 0.76 40 1 7 1.2 Empty Katupotha Chilaw 3.41 4.305	29	1	7	1.1	Empty	Wilpattu Sanctuary	Chilaw	0 765	0.495		
31 2 8 1.2 Plastic Product Battulu Oya Katupotha 1.73 2.095 32 2 7 1.1 Food Items Dummalasuriya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Chilaw 1.105 0.72 34 2 8 1.2 Food Items Palugassegama Katupotha 2.085 2.68 35 1 8 1.2 Coorcete Beams Palugassegama Katupotha 2.085 5.69 36 2 8 1.2 Concrete Beams Palugassegama Katupotha 3.395 5.695 37 2 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 40 1 7 1.2 Empty Katupotha Chilaw 3.41 4.305 41 1 6 1.2 Passengers Chilaw Andigama <	30	1	8	1.2	Motor Spare Parts	Wilnattu Sanctuary	Chilaw	1 01	1 255		
22 7 1.1 Food Items Dummalasuriya Katupotha 1.7.3 2.095 33 1 7 1.2 Empty Katupotha 0.73 0.595 34 2 8 1.2 Food Items Palugassegama Katupotha 2.085 2.68 35 1 8 1.2 Concrete Beams Palugassegama Katupotha 2.085 2.68 36 2 8 1.2 Concrete Beams Palugassegama Katupotha 3.395 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 39 1 8 1.2 PVC Product Arachchikattuwa Kurunegala 1.995 2.575 40 1 7 1.2 Empty Katupotha Chilaw 3.41 4.305	31	2	8	12	Plactic Broduct	Pottulu Ove	Kabuartha	1.01	1.335		
22 7 1.1 Pool items Jummalasunya Katupotha 0.73 0.595 33 1 7 1.2 Empty Katupotha Chilaw 1.105 0.72 34 2 8 1.2 Food Items Palugassegama Katupotha 2.085 2.68 35 1 8 1.2 Livestock Katupotha 1.655 1.69 36 2 8 1.2 Concrete Beams Palugassegama Katupotha 1.655 1.69 37 2 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Passengers Katupotha Chilaw 2.125 5.42 39 1 8 1.2 PVC Product Arachchikattuwa Kurunegala 1.985 2.575 40 1 7 1.2 Empty Katupotha Chilaw 3.41 4.305 41 1 6 1.2 Passengers Chilaw Andigama 1.225 1.125 <tr< td=""><td>27</td><td></td><td></td><td>1.2</td><td>Flastic Floudet</td><td>Dattulu Oya</td><td>Katupotna</td><td>1.73</td><td>2.095</td><td></td></tr<>	27			1.2	Flastic Floudet	Dattulu Oya	Katupotna	1.73	2.095		
33 1 7 1.2 Empty Katupotha Chilaw 1.105 0.72 34 2 8 1.2 Food Items Palugassegama Katupotha 2.085 2.68 35 1 8 1.2 Livestock Katupotha Katupotha 2.025 1.93 36 2 8 1.2 Concrete Beams Palugassegama Katupotha 3.035 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Passengers Nilpatu Sanctuary Chilaw 1.355 0.78 40 1 7 1.2 Empty Katupotha Chilaw 1.355 0.78 41 1 6 1.2 Passengers Ulipatu Sanctuary Chilaw 3.65 5.03 42 2 6 1.2 Passengers Chilaw Andigama 1.225 1.125 43 2 7 1.1 Coconut Prod Chilaw	32	2		1.1	Food items	Oummalasunya	Katupotha	0.73	0.595		
34 2 8 1.2 Food Items Palugassegama Katupotha 2.085 2.68 35 1 8 1.2 Livestock Katupotha Kandana 2.025 1.93 36 2 8 1.2 Concrete Beams Palugassegama Katupotha 1.655 1.69 37 2 6 1.2 Passengers Chilaw Katupotha 3.95 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 3.95 5.695 40 1 7 1.2 Empty Katupotha Chilaw 1.355 0.78 41 1 6 1.2 Passengers Chilaw Milpattu Sanctuary 3.65 5.03 42 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 3.65 5.03 43 2 7 1.1 Coconut Prod Chilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha 1.66 1.76	33	1	7	1.2	Empty	Katupotha	Chilaw	1.105	0.72		
35 1 8 1.2 Livestock Katupotha Kardana 2.025 1.93 36 2 8 1.2 Concrete Beams Palugassegama Katupotha 1.655 1.69 37 2 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 39 1 8 1.2 PVC Product Arachchikattuwa Kurunegala 1.985 2.575 40 1 7 1.2 Empty Katupotha Chilaw 1.355 0.78 41 1 6 1.2 Passengers Vilpatu Sanctuary Chilaw 3.41 4.305 42 2 6 1.2 Passengers Chilaw Wilpatu Sanctuary 3.65 5.03 43 2 7 1.1 Coconut Prod Chilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha 1.66 1.76<	34	2	8	1.2	Food Items	Palugassegama	Katupotha	2.085	2.68		
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30 2 6 1.2 Control etcle bearts Padugassegaria Natupotha 3.095 5.695 37 2 6 1.2 Passengers Chilaw Katupotha 3.395 5.695 38 1 6 1.2 Passengers Katupotha Chilaw 2.125 5.42 39 1 8 1.2 PVC Product Arachchikattuwa Kurunegala 1.985 2.575 40 1 7 1.2 Empty Katupotha Chilaw 1.355 0.78 41 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 3.65 5.03 42 2 6 1.2 Passengers Chilaw Wilpatu Sanctuary 3.65 5.03 43 2 7 1.1 Coconul Prod Chilaw Madigama 1.225 1.125 44 1 8 1.2 Plastic Product Katupotha Chilaw 1.46 1.3 45 1 8 1.2 Plastic Product Katupotha 1.65 1.65 1.65 46 1 7 1.1 Geoceries	26	2	0	12	Concrete Reams	Paluassaama	Katupotha	1 655	1 60		
37 2 6 1.2 Passengers Chilaw Aupotha 3.385 5.895 38 1 6 1.2 Passengers Katupotha Chilaw 2.125 5.42 39 1 8 1.2 PVC Product Arachchikattuwa Kurunegala 1.985 2.575 40 1 7 1.2 Empty Katupotha Chilaw 1.355 0.78 41 1 6 1.2 Passengers Wilpatu Sonctuary Chilaw 3.41 4.305 42 2 6 1.2 Passengers Chilaw Wilpatu Sanctuary 3.65 5.03 43 2 7 1.1 Coconut Prod Chilaw Milpatu Sanctuary 3.66 1.32 44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.355 44 1 8 1.2 Empty Katupotha 1.61 1.475 44 1 8 1.2 Empty Chilaw Katupotha 1.65 1.35 44 1 8 1.2 Empty Chilaw Katupotha 1.65	30	4	0	1.4	Conciele Beams	In alugasseyania	Katupoula	1.000	5.005		
38 1 6 1.2 Passengers Katupotha Chilaw 2.125 5.42 39 1 8 1.2 PVC Product Arachchikattuwa Kunnegala 1.985 2.575 40 1 7 1.2 Empty Katupotha Chilaw 1.355 0.78 41 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 3.65 5.03 42 2 6 1.2 Passengers Chilaw Wilpatu Sanctuary 3.65 5.03 43 2 7 1.1 Coconut Prod Chilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.3 45 1 8 1.2 Plastic Product Katupotha 1.66 1.76 46 1 7 1.1 Groceries Anamaduwa Chilaw 1.305 2.065 47 2 8 1.2 Stel Prod Chilaw Katupotha 1.64 1.285 <td>37</td> <td>2</td> <td>6</td> <td>1.2</td> <td>Passengers</td> <td>Chilaw</td> <td>Natupotna</td> <td>3.395</td> <td>5.095</td> <td></td>	37	2	6	1.2	Passengers	Chilaw	Natupotna	3.395	5.095		
39 1 8 1.2 PVC Product Arachchikattuwa Kurunegala 1.985 2.575 40 1 7 1.2 Empty Katupotha Chilaw 1.355 0.78 41 1 6 1.2 Passengers Wilpatu Sanctuary Chilaw 3.41 4.305 42 2 6 1.2 Passengers Chilaw Wilpatu Sanctuary 3.65 5.03 43 2 7 1.1 Coconut Prod Chilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.3 45 1 8 1.2 Plastic Product Katupotha Chilaw 1.66 1.76 46 1 7 1.1 Groceries Anamaduwa Chilaw Katupotha 1.66 1.76 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.65 1.3 48 2 7 1.1 Cement Chilaw Katupotha <	38	1	6	1.2	Passengers	Katupotha	Chilaw	2.125	5.42		
40 1 7 1.2 Empty Katupotha Chilaw 1.355 0.78 41 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 3.41 4.305 42 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 3.65 5.03 43 2 7 1.1 Coconut Prod Chilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.3 45 1 8 1.2 Plastic Product Katupotha Chilaw 1.61 1.475 46 1 7 1.1 Groceries Anamaduwa Chilaw 1.305 2.065 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.66 1.76 47 2 8 1.2 Ruber/Rubber Prod Negombo Katupotha 1.64 1.285 50 2 8 1.2 Empty Chilaw Katupotha 1.64 1	39	1	8	1.2	PVC Product	Arachchikattuwa	Kurunegala	1.985	2.575		
41 1 6 1.2 Passengers Wilpattu Sanctuary Chilaw 3.41 4.305 42 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 3.65 5.03 43 2 7 1.1 Coconut Prod Chilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.3 44 1 8 1.2 Plastic Product Katupotha Chilaw 1.46 1.3 44 1 8 1.2 Plastic Product Katupotha Chilaw 1.61 1.475 44 1 8 1.2 Plastic Product Katupotha Chilaw 1.66 1.76 45 1 8 1.2 Steel Prod Chilaw Katupotha 1.65 1.76 47 2 8 1.2 Rubber/Rubber Prod Legombe Katupotha 1.64 1.78 48 2 7 1.1 Cement Chilaw Katupotha 1.545 1.3 49 2 8 1.2 Empty Chilaw Katupotha	40	1	7	12	Empty	Katupotha	Chilaw	1.355	0.78		
41 1 0 1.2 Passengers Prince Cancedary Wilpattu Sanctuary 3.65 5.03 42 2 6 1.2 Passengers Chilaw Wilpattu Sanctuary 3.65 5.03 43 2 7 1.1 Coconut Prod Chilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.3 44 1 8 1.2 Plastic Product Katupotha Chilaw 1.61 1.475 46 1 7 1.1 Groceries Anamaduwa Chilaw 1.305 2.065 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.66 1.76 48 2 7 1.1 Cement Chilaw Katupotha 1.645 1.3 49 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 50 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 51 1 8 1.2 Empty Chilaw Katupotha	40			1.2	Passanoers	Vilnatiu Sanctuary	Chilaw	3.41	4,305		
42 2 6 1.2 Passengers Onliaw Windated carcedary 3.05 3.05 43 2 7 1.1 Coconut Prod Chilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.3 45 1 8 1.2 Plastic Product Katupotha Chilaw 1.61 1.475 46 1 7 1.1 Groceries Anamaduwa Chilaw 1.305 2.065 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.66 1.76 47 2 8 1.2 Rubber/Rubber Prod Negombo Katupotha 1.64 1.285 49 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 50 2 8 1.2 Empty Katusotha 1.145 0.63 51 1 8 1.2 Empty Katusotha 1.145 0.63 52 2 <t< td=""><td>41</td><td>1</td><td>0</td><td>1.2</td><td>r assengers</td><td>Thilow</td><td>Mainath Sanchusor</td><td>3.65</td><td>5.02</td><td></td></t<>	41	1	0	1.2	r assengers	Thilow	Mainath Sanchusor	3.65	5.02		
43 2 7 1.1 Coconut Prod F.hilaw Andigama 1.225 1.125 44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.3 45 1 8 1.2 Plastic Product Katupotha Chilaw 1.61 1.475 46 1 7 1.1 Groceries Anamaduwa Chilaw 1.63 1.475 46 1 7 1.1 Groceries Anamaduwa Chilaw 1.63 1.475 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.66 1.76 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.64 1.895 2.47 48 2 7 1.1 Cement Chilaw Katupotha 1.64 1.285 50 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 51 1 8 1.2 Empty Chilaw 1.64 1.285 52 2 8 1.2 Empty Catupotha 0.64 0.53	42	2	6	1.2	Passengers	William	Andiagence	1.00	1 4 25		
44 1 8 1.2 Empty Katupotha Chilaw 1.46 1.3 45 1 8 1.2 Plastic Product Katupotha Chilaw 1.61 1.475 46 1 7 1.1 Groceries Anamaduwa Chilaw 1.305 2.065 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.66 1.76 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.895 2.065 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.895 2.47 48 2 7 1.1 Cement Chilaw Katupotha 1.545 1.3 49 2 8 1.2 Empty Chilaw Katupotha 1.545 1.3 50 2 8 1.2 Empty Chilaw Katupotha 1.17 1.36 51 1 8 1.2 Empty Katupotha 1.17 1.36 52 2 8 1.2 Empty Katupotha 0.64 0.53 53	43	2	7	1.1	Coconut Prod	i nilaw	Andigama	1.225	1.125		
45 1 8 1.2 Plastic Product Katupetha Chilaw 1.61 1.475 46 1 7 1.1 Groceries Anamaduwa Chilaw 1.305 2.065 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.66 1.76 48 2 7 1.1 Cement Chilaw Katupotha 1.895 2.47 48 2 7 1.1 Cement Chilaw Katupotha 1.654 1.3 49 2 8 1.2 Rubber/Rubber Prot Negombo Katupotha 1.64 1.285 50 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 51 1 8 1.2 Empty Katupotha 1.64 1.285 51 1 8 1.2 Empty Katupotha 1.64 1.285 52 2 8 1.2 Empty Katupotha 0.64 0.53 53 1 8 1.2 Em	44	1	8	1.2	Empty	Katupotha	Chilaw	1.46	1.3		
45 1 7 1.1 Groceries Anamaduwa Chilaw 1.305 2.065 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.66 1.76 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.65 1.76 48 2 7 1.1 Cement Chilaw Katupotha 1.64 1.285 49 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 50 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 51 1 8 1.2 Empty Katusotha 1.64 1.285 52 2 8 1.2 Plastic Product Fulgassegama Katupotha 1.145 0.63 53 1 8 1.2 Empty Katupotha 0.64 0.53 54 1 7 1.1 Coconut Prod Wennapcuwa Katupotha 0.64 0.53 55 1	15	1	0	12	Plastic Product	Katupotha	Chilaw	1.61	1.475		
46 1 7 1.1 Globeles 1.1 Globeles 1.1 Globeles 47 2 8 1.2 Steel Prod Chilaw Katupotha 1.66 1.76 48 2 7 1.1 Cement Chilaw Katupotha 1.895 2.47 48 2 7 1.1 Cement Chilaw Katupotha 1.545 1.3 49 2 8 1.2 Rubber/Rubber Prof Legombe Katupotha 1.64 1.285 50 2 8 1.2 Empty Chilaw Katupotha 1.65 1.55 51 1 8 1.2 Empty Chilaw Katupotha 1.17 1.36 52 2 8 1.2 Empty Katupotha 1.17 1.36 52 2 8 1.2 Empty Katupotha 0.64 0.53 53 1 8 1.2 Empty Katupotha 0.64 0.53 54 1 7 1.1 Coconut Prod Wennageuwa Katupotha 0.64 0.53 55 1 6 1.2 Empty	45			4.4	Grocerier	Anamaduwa	Chilaw	1.305	2.065		
47 2 8 1.2 Steel Prod Iomaw Religion 1.855 2.47 48 2 7 1.1 Cement Chilaw Katupotha 1.855 2.47 49 2 8 1.2 Rubber/Rubber Prolegombo Katupotha 1.645 1.3 49 2 8 1.2 Rubber/Rubber Prolegombo Katupotha 1.64 1.285 50 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 51 1 8 1.2 Empty Chilaw 1.555 1.55 51 1 8 1.2 Empty Katupotha 1.17 1.36 52 2 8 1.2 Empty Katupotha Chilaw 1.17 1.36 53 1 8 1.2 Empty Katupotha Chilaw 1.145 0.63 53 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 4.15 6.535 55 1 6 1.2 Empty Katupotha Battulu Oya 0.56 1.07 0.655 56 </td <td>46</td> <td>1</td> <td></td> <td>1.1</td> <td>Giocenes</td> <td>Chilaw</td> <td>Katupotha</td> <td>1.66</td> <td>1.76</td> <td></td>	46	1		1.1	Giocenes	Chilaw	Katupotha	1.66	1.76		
48 2 7 1.1 Cement Chilaw 1.000 2.11 49 2 8 1.2 Rubber/Rubber Proleagombo Kaupotha 1.545 1.3 50 2 8 1.2 Empty Chilaw 1.545 1.3 50 2 8 1.2 Empty Chilaw 1.555 1.55 51 1 8 1.2 Empty Katupotha 1.145 0.63 52 2 8 1.2 Empty Katupotha 0.64 0.53 53 1 8 1.2 Empty Katupotha 0.64 0.53 53 1 8 1.2 Empty Katupotha 0.64 0.53 54 1 7 1.1 Coconut Prod Wennapeuwa Katupotha 0.64 0.53 54 1 7 1.1 Coconut Prod Wennapeuwa Katupotha 0.64 0.53 55 1 6 1.2 Passengers Onlaw Wilpattu Sanctuary 4.15 6.535 55 1 6 1.2 Empty Katupotha 0.71 0.44 </td <td>47</td> <td>_ 2</td> <td>8</td> <td>1.2</td> <td>Steel Prod</td> <td></td> <td>Katupotha</td> <td>1 895</td> <td>247</td> <td></td>	47	_ 2	8	1.2	Steel Prod		Katupotha	1 895	247		
49 2 8 1.2 Rubber/Rubber Pro Negombo Katupotha 1.345 1.3 50 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 51 1 8 1.2 Empty Katusetha Chilaw 1.555 1.555 51 1 8 1.2 Empty Katusetha Chilaw 1.555 1.555 52 2 8 1.2 Plastic Product Folgassegama Katupotha 1.145 0.63 53 1 8 1.2 Empty Katupotha Chilaw 1.145 0.63 53 1 8 1.2 Empty Katupotha 0.64 0.53 54 1 7 1.1 Coconut Prod Wennageowa Katupotha 0.64 0.53 55 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 4.15 6.535 56 1 8 1.2 Empty Katupotha Battulu Oya 0.56 1.07 0.655	48	2	7	1.1	Cement	Cheaw	Katupotta	1 545	13		
47 2 8 1.2 Empty Chilaw Katupotha 1.64 1.285 50 2 8 1.2 Empty Katupotha 1.64 1.285 51 1 8 1.2 Empty Katupotha Chilaw 1.555 1.55 52 2 8 1.2 Plastic Product Clugassegama Katupotha 1.17 1.36 53 1 8 1.2 Empty Katupotha 0.64 0.53 53 1 8 1.2 Empty Katupotha 0.64 0.53 54 1 7 1.1 Coconut Prod Wennapouwa Katupotha 0.64 0.53 55 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 4.15 6.535 55 1 6 1.2 Passengers Chilaw 0.71 0.44 57 1 7 1.1 Empty Katupotha Battulu Oya 0.56 1.07 0.655 58 1 15 <	10	2	8	1.2	Rubber/Rubber Pro	1 redomps	Katupona	1.045	1.0		
50 2 0 1.2 Empty Katurentha Chilaw 1.555 1.55 51 1 8 1.2 Empty Katurentha Chilaw 1.17 1.36 52 2 8 1.2 Plastic Product Follogassegama Katupotha 1.17 1.36 53 1 8 1.2 Empty Katupotha Chilaw 1.145 0.63 53 1 8 1.2 Empty Katupotha Chilaw 1.145 0.63 54 1 7 1.1 Coconut Prod Weinagedwa Katupotha 0.64 0.53 55 1 6 1.2 Passengers Chilaw Wilpatu Sanctuary 4.15 6.535 56 1 8 1.2 Empty Katupotha D.44 57 1 7 1.1 Empty Katupotha Battulu Oya 0.56 1.07 0.655 58 1 15 1.11 Empty Natupotha Kinyankalli 1.655 1.52 59 2 8 1.2 Cement Prod/Terra catapetna Kinyankalli 1.655 <t< td=""><td>49</td><td>- 4</td><td></td><td>10</td><td>Empty</td><td>Chilaw</td><td>Katupotha</td><td>1.64</td><td>1.285</td><td></td></t<>	49	- 4		10	Empty	Chilaw	Katupotha	1.64	1.285		
51 1 8 1.2 Empty 1.000 million 1.17 1.36 52 2 8 1.2 Plastic Product Follogassegama Katupotha 1.145 0.63 53 1 8 1.2 Empty Katupotha Chilaw 1.145 0.63 53 1 8 1.2 Empty Katupotha Chilaw 0.64 0.53 54 1 7 1.1 Coconut Prod Wennaptowa Katupotha 0.64 0.53 55 1 6 1.2 Passengers Onlaw Wilpattu Sanctuary 4.15 6.535 56 1 8 1.2 Empty Katupotha Chilaw 0.71 0.44 57 1 7 1.1 Empty Katupotha Battulu Oya 0.56 1.07 0.655 58 1 15 1.1.1 Empty Valuoctha Battulu Oya 0.56 1.52 59 2 8 1.2 Cement Prod/Terra satupotha Kiriyankalli 1.655 1.52 60 1 9 1.2 Cement Cotemba Katupotha	50	2	8	1.2	Camply	Katupotha	Chilaw	1.555	1.55		
52 2 8 1.2 Plastic Product augus seguna Chilaw 1.145 0.63 53 1 8 1.2 Empty saupotha Chilaw 1.145 0.63 54 1 7 1.1 Coconut Prod Wenapeuwa Katupotha 0.64 0.53 55 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 4.15 6.535 56 1 8 1.2 Empty Katupotha Negombo 1.515 1.715 56 1 8 1.2 Empty Katupotha Battulu Oya 0.56 1.07 0.655 57 1 7 1.1 Empty Valuetha Battulu Oya 0.55 1.07 0.655 58 1 15 1.1.1 Empty Valuetha Battulu Oya 0.55 1.52 59 2 8 1.2 Cement Prod/Terro saluetha Katupotha 2.715 5.055 60 1 9 1.2 Cement Colembo Katupotha 2.715 5.055	51	1	8	1.2	Emply	Emerge second	Katupotha	1.17	1.36		
53 1 8 1.2 Empty Saturpoida Onlaw Dilaw 53 1 8 1.2 Empty Wennapeuwa Katupotha 0.64 0.53 54 1 7 1.1 Coconut Prod Wennapeuwa Katupotha 0.64 0.53 55 1 6 1.2 Passengers Chilaw Wilpattu Sanctuary 4.15 6.535 56 1 8 1.2 Empty Katupotha Negombo 1.515 1.715 56 1 8 1.2 Empty Katupotha Delway 0.56 1.044 57 1 7 1.1 Empty Katupotha Battulu Oya 0.55 1.07 0.655 58 1 15 1.1.1 Empty Natupotha Battulu Oya 0.55 1.52 59 2 8 1.2 Cement Prod/Terra valueotha Kinyankalli 1.655 1.52 60 1 9 1.2 Cement Columbo Katupotha 2.715 5.055	52	2	8	1.2	Plastic Product	alugassegana	Chilaw	1.145	0.63		
54 1 7 1.1 Coconut Prod Wennappuwa Naupoura Color 0.54 0.55 0.55 0.55 1 6 1.2 Passengers Chilaw Wilpatu Sanctuary 4.15 6.535 55 1 6 1.35 1.715 55 1 8 1.2 Empty Katurotha Regondo 1.515 1.715 56 1 8 1.2 Empty Katurotha Bathulu Oya 0.56 1.07 0.644 57 1 7 1.1 Empty Katurotha Bathulu Oya 0.56 1.07 0.655 58 1 15 1.1.1 Empty Katurotha Bathulu Oya 0.56 1.07 0.655 1.52 59 2 8 1.2 Cement Colornbo Katurotha 2.715 5.055 50 60 1 9 1.2 Cement Colornbo Katurotha 2.715 5.055 50	52	1	8	1,2	Empty	Valuboara	Katupotha	0.64	0.53		
54 1 7 1.2 Passengers Option Wilpartu Sanctuary 4.15 6.535 55 1 6 1.2 Passengers Option Negombo 1.515 1.715 56 1 8 1.2 Empty Katupetho Ohilaw 0.71 0.44 57 1 7 1.1 Empty Katupetho Ohilaw 0.71 0.44 57 1 15 1.1.1 Empty Naturetho Ohilaw 0.56 1.07 0.655 58 1 15 1.1.1 Empty Naturetho Kinyankalli 1.655 1.52 59 2 8 1.2 Cement Prod/Terro Alucetho Katupotha 2.715 5.055 60 1 9 1.2 Cement Octembo Katupotha 2.715 5.055				11	Coconut Prod	Wennapouwa	Indiupoula	4.15	6 535	·	
S5 1 6 1.2 [mpty Katurxing Negombo 1.515 1.715 56 1 8 1.2 [mpty Katurxing Chilaw 0.71 0.44 57 1 7 1.1 [mpty Katurxing Battulu Oya 0.56 1.07 0.655 58 1 15 1.1.1 [mpty Natrocha Battulu Oya 0.56 1.52 59 2 8 1.2 Cement Prod/Terra Alagetha Kinyankalli 1.655 1.52 60 1 9 1.2 Cement Colembo Katupotha 2.715 5.055	54				Dassenners	Chilaw	wilpattu Sanctuary	4.13	0.000		
56 1 8 1.2 Empty Katurettio Chilaw 0.71 0.44 57 1 7 1.1 Empty Naturettio Battulu Oya 0.56 1.07 0.655 58 1 15 1.1.1 Empty Naturettio Kinyankalli 1.655 1.52 59 2 8 1.2 Cement Prod/Terro allabetha Katupotha 2.715 5.055 60 1 9 1.2 Cement Columbo Katupotha 2.715 5.055	55	1	6	1.2	Fassengero	(Katupetha	Negombo	1.515	1.715		
57 1 7 1.1 Emply Nature of the second sec	56	1	8	1.2	Emply	2 aturolla	Chilaw	0.71	0.44		
58 1 15 1.1.1 Empty Value of a 58 1 15 1.1.1 Empty Value of a 59 2 8 1.2 Cement Prod/Terro Alue of a 60 1 9 1.2 Cement Colombo Katupotha 2.715 5.055	57	1	7	1.1	Empty	Noture the	Battulu Ova	0.56	1.07	0.655	
36 1 2 8 1.2 Cement Prod/Terral algorithm Contraction	50		15	1.1.1	Empty	Additiocard	Kiriyankalli	1.655	1.52		
59 2 0 1.2 Cement Cotombo Kaupuna 1.1 Cotombo 60 1 9 1.2 Cement Cotombo Kaupuna 1 1.1	38			12	Cement Prod/Terra	i. alupetha	Katupotha	2715	5.055		
60 1 9 1.2 Center	59	2	8	4.0	Cement	1Colombo	Indiupound		1 0.000		
Note:	60	1	9	1.2	Centent						
	Note	-	State and State								

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AXLE LOAD Survey at Bathuluoya - Dewalahandiya Rd on 2007/12/14

Direction :

1- Bathuluoya 2- Dewalahandiya

<u>KLE LOAD Survey at Udupila (Delgoda) of Kirillawala - Udupila Rd on 28-11-2007</u>

NO	DIR	VEH	AXLE						
		TYPE	CONFIG	LOAD TYPE	ORICIN			Avia Load	
1	2	5	1.2	Passengere	ONIGIN	DISTINATION	AYLET	AYI E2	AYIE3
2	2	7	1.1	Empty	Kirillawala	Delgoda	1 44	1.66	AALLS
3	2	8	1.2	Empty	Kirillawala	Kaduwela	1 28	0.845	
4	2	7	11	Salt Ross	Kelaniya	Delgoda	1 545	0.045	
5	1	8	12	Non Durcht	Kirillawala	Kaduwela	1 195	1 19	
6	1	7	11	Empty	Delgoda	Kirillawala	1 305	1 44	
7	1	9	12	Empty	Delgoda	Colombo	11	0 945	
8	1	8	12	Empty	Kelaniya	Nawagamuwa	3,285	3.03	
9	2	8	1.2	Empty	Delgoda	Kirillawala	1 385	0.98	
10	2	7	11	Empty	Kirillawala	Deigoda	1.545	1,205	
11	1	8	1.1	Empty	Kiriliawala	Delgoda	0.725	0.285	
12		7	1.2	Empty	Delgoda	Kirillawala	1.415	1.325	
12		8	1.1	Motor Spare Parts	Kirillawala	Rajagiriya	0.615	0.385	
13		0	1.2	Empty	Delgoda	Kirillawala	1.465	1.14	
14		0	1.2	Empty	Delgoda	Kadawata	3.735	3.615	
15		8	1.2	Empty	Weboda	Dekatana	1.67	1.29	
16		1	1.1	Empty	Weboda	Kirillawala	0.74	0.335	
17	1	9	1.2	Empty	Delgoda	Kirillawala	1.375	1.005	
18	1	7	1.1	Food Items	Deigoda	Kiriilawala	0.745	0.44	
19	2	9	1.2	Empty	Kirillawala	Delgoda	1.345	1.285	
20	1	9	1.2	Empty	Delgoda	Kirillawala	1.345	1.285	
21	2	7	1.1	Empty	Kirillawala	Kirindiwela	1.105	0.75	
22	2	8	1.2	Hardwere Items	Kirillawala	Delgoda	0.94	0.715	
23	2	7	1.1	Empty	Kirillawala	Delgoda	1.4	1.065	
24	2	8	1.2	Empty	Ja-Ela	Delgoda	1.61	1.37	
25	1	8	1.2	Empty	Delgoda	Kadawata	2.29	2.165	and the second
26	1	6	1.2	Empty	Kirillawala	Kirillawala	2.12	4.85	
27	1	7	1.1	Empty	Delgoda	Kadawata	0.96	0.505	all second and
28	2	6	1.2	Passengers	Colombo	Delgoda	4.18	4.99	
29	1	8	1.2	Medince	Weliweriya	Kirillawala	1.715	1.705	-
30		7	1.1	Empty	Weliweriya	Kirillawala	1.21	0.95	
31	2	7	11	Empty	Kirillawala	Delgoda	1.315	1.385	
32	2	7	11	Earth/Soil/Clay	Minuwangoda	Delgoda	2.04	3.06	
33	2	8	12	Emoty	Kirillawala	Delgoda	1.48	1.215	
34	2	8	12	Matal	Dekatana	Kirillawala	2.175	4.975	
25		- 7	1 1	Emoty	Kirillawala	Delgoda	0.84	0.64	
- 35	- 2	0	1.1	Empty	Kirillawala	Delgoda	1.51	1.17	and the second
30	2	0	1.2	Plastic Product	Kadawata	Kalutara North	1.33	1.08	
- 37	2	8		Emphy	Mahabage	Delgoda	1.45	1.195	
38	2	8	1.4	Wooden Prod	Delgoda	Kirillawala	1.275	2.03	and the second second
39	1	/	1.1	Wooden rice	Delgoda	Imbulgoda	2.01	5.68	
_40	1	8	1.2	Decembers	Delgoda	Colombo	3.54	4.55	and the second second
_41	1	6	1.2	Passengers	Kaduwela	Kirillawala	1.7	4.5	
_42	1	8	1.2	Natal	Colombo	Kirillawala	4.05	6.905	7.13
_43	1	10	1.22	Cement	Kiriliawala	Kirillawala	0.81	0.935	and the second second
44	1	7	1.1	Empty	Kirillawala	Delgoda	1.265	0.955	
45	2	7	1.1	Empty	Delgoda	Kirillawala	1.805	1.935	Marrie Cont
46	1	8	1.2	Soap	Delgoda	Kirillawala	1.695	3.205	a for the second
42		0	12	Cement					

and new land

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48	1	8	1.2	Matal	Matal						
49	1	8	1.2	Empty	Kadawata	Kirillawala	1 705	3 685			
50	1	8	1.2	Vegetables	Delgoda	Kirillawala	1.705	4 895			
51	1	7	1.1	Empty	Negombo	Kirillawala	1.04	1.035			
52	1	8	12	Empty	Delgoda	Kirillawata	1 265	0.055			
53	2	8	12	Empty	Kaduwela	Kirillawala	0.95	0.900			
54	1	8	12	Emply	Kirillawala	Delooda	1.46	0.00			
55	1	8	12	Diast	Delgoda	Kirillawala	1 345	1 285			
- 56	2	8	1.2	Plastic Product	Delgoda	Ganemulla	1.040	1.205			
57	2	8	1.2	Empty	Kirillawala	Delgoda	1.71	1.075	The second s		
50		- 0	1.2	Earth/Soil/Clay	Kirillawala	Bivagama	1.33	1 175			
50	2		1.2	Earth/Soil/Clay	Mahabage	Kirillawala	2 17	1.175			
39		0	1.2	Earth/Soil/Clay	Mahabage	Weliweriya	2.17	5.06			
60		0	1.2	Matal	Delgoda	Kirillawala	1 795	3 755			
61	1	8	1.2	Empty	Biyagama	Kirillawala	1.705	3.755			
62	1	8	1.2	Matal	Delgoda	Kirillawala	2.025	4.01			
63	2	8	1.2	Hardwere Items	Kirillawala	Kadawata	1 705	4.91			
64	1	8	1.2	Empty	Imbulgoda	Moratunia	1.795	1.00			
65	2	7	1.1	Hardwere Items	Radawana	Delando	1.00	0.575	-		
66	2	9	1.2	Empty	Kadawata	Delgoda	1.24	1.14			
67	1	9	1.2	Rubber/Rubber Pro	Kadawata	Kirillawala	2.100	1.955			
68	1	9	1.2	Empty	Delaoda	Kinilawala	1.00	1.455			
69	2	9	12	Rice/Paddy	Kirillawala	Deleade	1.44	1.35	-		
70	2	8	12	Ashestos	Kisillawala	Deigoda	2.14	3.395			
71	2	7	11	Empty	Kinilawala	Aturugiriya	1.58	0.995			
72	2	7	11	Engl Home	Kadawata		0.405	0.395			
72	4	0	1.1	Metel	Kiriliawala	Delgoda	0.76	0.5			
13		0	1.2		Deigoda	Kirillawala	2.09	4.56			
14	2	0	1.4	Empty	Ganemulia	Delgoda	1.08	1.4	-		
75	2	8	1.2	Empty	Kirillawala	Kaduwela	1.24	0.74	-		
76	2	8	1.2	Empty	Ganemulla	Delgoda	2.635	3.73			
77	1	8	1.2	Empty	Kottawa	Kirillawala	1.4/5	1.545			
78	2	8	1.2	Empty Barrel	Ganemulla	Delgoda	2.1/5	2.47			
79	2	9	1.2	Earth/Soil/Clay	Kirillawala	Delgoda	2.36	4.525			
80	2	9	1.2	Food Items	Kadawata	Weliweriya	1.76	2.23			
81	1	7	1.1	Empty	Delgoda	Gampaha	0.85	0.93			
82	2	8	1.2	Empty	Kirillawala	Delgoda	1.44	1.15			
83	1	8	1.2	Empty	Malwana	Kirillawala	1.64	1.46			
84	2	6	1.2	Passengers	Kirillawala	Kaduwela	2.26	3.395			
85	1	8	12	Empty	Delgoda	Kirillawala	1.46	1.215			
86	1	8	12	Empty	Delgoda	Kirillawala	1.595	0.965			
- 00		0	12	Empty	Delgoda	Kirillawala	1.335	1.49			
0/		0	1.2	Empty	Kirillawala	Delgoda	2.05	4.085			
00	2	8	1.2	Empty	Kirillawala	Delgoda	1.011	1.033			
89	2	8	1.2	Empty	Delgoda	Kirillawala	0.955	1.025			
90	1	8	1.2	Empty	Deigoda	Kirillawala	1.4	1.075			
91	1	8	1.2	Empty	Delgoda	Kirillawala	1.585	0.87			
92	1	8	1.2	Emply	Delgoda	Colombo	3.185	3.095			
93	1	6	1.2	Empty	Delgoda	Kirillawala	2.32	3.49			
94	1	8	1.2	Empty	Kirillawala	Kadawata	2.155	4.565			
95	1	8	1.2	Matal	Malwana	Kirillawala	1.61	1.175			
96	1	8	1.2	Empty	Pugoda	Kadawata	1.835	4.225	-		
97	1	8	1.2	Sand	Kirillawala	Kadawata	1.785	3.68			
98	1	7	1.1	Matal	Kaduwela	Kadawata	1.225	0.82			
90	1	9	1.2	Wooden Prod	Industroit						
		0									

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100	1	6	1.2	Empty					
101	2	8	1.2	Earth/Soil/Clau	Delgoda	Colombo	3 28	3.675	
102	2	8	1.2	Empty	Kirillawala	Kirillawala	2 15	3 925	
103	2	7	1.2	Textiles	Kirillawala	Delgoda	1,265	0.785	
104	1	5	1.2	Passengers	Nugegoda	Delgoda	1.22	1.27	
105	1	5	1.2	Passengers	Delgoda	Kirillawala	2.035	4.165	
106	2	8	1.2	Empty	Thihariya	Kirillawala	1.355	1.74	
107	1	8	1.2	Empty	Kadawata	Kaduwela	1.735	1.55	
108	2	8	1.2	Empty	Delgoda	Kirillawala	1.35	1.315	
109	2	7	1.1	Empty	Keianiya	Kirillawala	1.25	1.425	
110	2	8	1.2	Medince	Radawata	Biyagama	1.135	0.64	
111	2	9	1.2	Empty	Ragama	Delgoda	1.805	1.605	
112	1	8	1.2	Empty	Delgoda	Kirillawala	1.785	1.87	
113	1	8	1.2	Empty	Delgoda	Kirillawala	1.49	1.163	
114	2	8	1.2	Empty	Kirillowala	Kirillawala	1.525	1.1	
115	2	8	1.2	Earth/Soil/Clay	Kirillawala	Delgoda	1.445	1.055	
116	1	8	1.2	Matal	Delando	Deigoda	2.235	4.16	
					Theigoda	Inadawata	2.1	5.185	

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Note:

Direction :

1- Kirillawala 2- Udupila

AXLE LOAD Survey at Neluwa-Kadihingala- Dellawa- Morawaka Road on 05-12-2007

Sr NO	DIR	VEH	AXLE		_					
	Dar	TYPE	CONFIG	LOAD TYPE	ORIGIN	DECEMBER	Avie Load			
1	1	6	1.2	Passengere	ONION	DESTINATION	AXLE1	AXI F2	AXLE3	
2	1	8	1.2	Wooden Brod	Morawaka	Galle	3.45	3.35		
3	2	6	1.2	Passengero	Middeniya	Neluwa	2.065	4.23		
4	1	6	1.2	Passengers	Neluwa	Morawaka	2.31	2.74		
5	2	6	1.2	Empty	Morawaka	Neluwa	2.625	2.54		
6	1	6	12	Passonger	Galle	Morawaka	1.92	2.24		
7	2	15	1.1.1	Sand	Morawaka	Galle	1.97	2.41		
8	2	15	111	Empty	Neluwa	Morawaka	0.5	1.65	1.98	
9	2	6	12	Passonante	Neluwa	Morawaka	0.525	1.035	0.49	
10	1	6	12	Passengers	Neluwa	Morawaka	2.29	2.7		
11	2	7	11	Empty	Morawaka	Neluwa	2.28	2.99		
12	1	6	12	Empty	Neluwa	Morawaka	0.985	0.58		
13	2	8	1.2	Empty	Udugama	Neluwa	2.35	1.98		
14	1	15	111	Empty	Neluwa	Morawaka	1.055	1.135		
14	1	15	1.1.1	Empty	Morawaka	Neluwa	0.45	1.045	0.75	
15		0	1.2	Empty	Morawaka	Neluwa	2.35	1.98		
10	- 2	0	1.2	Passengers	Udugama	Morawaka	1.89	2.9		
1/		10	1.1.1	Empty	Morawaka	Neluwa	0.44	1.05	0.76	
18	2	15	1.1.1	Fertiliser	Neluwa	Morawaka	0.44	1.635	1.8	
19	2	8	1.2	Sand	Neluwa	Morawaka	1.435	2.965		
20	1	1	1.1	Empty	Ratnapura	Neluwa	1.095	0.89		
21	1	6	1.2	Empty	Morawaka	Neluwa	1.9	2.85		
22	1	8	1.2	Food Items	Morawaka	Neluwa	1.165	1.55		
23	1	15	1.1.1	Sand	Morawaka	Neluwa	0.38	1.32	1.565	
24	2	6	1.2	Empty	Udugama	Morawaka	1.86	2.065		
25	2	7	1.1	Empty	Neluwa	Morawaka	1.095	0.89		
26	1	6	1.2	Empty	Morawaka	Udugama	1.86	2.065		
27	1	9	1.2	Empty	Morawaka	Neluwa	2.5	2.25		
28	1	8	1.2	Milk	Waralla	Neluwa	1.2	1.45		
29	2	8	1.2	Sand	Neluwa	Morawaka	1.915	3.675		
30	1	6	1.2	Passengers	Morawaka	Galle	2.75	3.09		
31	2	9	1.2	Empty	Neluwa	Morawaka	2.45	2.3		
32	1	6	1.2	Passengers	Galle	Neluwa	2.65	2.9		
33		7	1.1	Empty	Morawaka	Neluwa	1.05	0.9		
34	1	8	1.2	Empty	Morawaka	Neluwa	1.06	1.15		
25		6	1.2	Passengers	Galle	Morawaka	3.475	3.34		
26	2	15	111	Empty	Neluwa	Morawaka	0.53	1.105	0.62	
27	4	15	111	Empty	Morawaka	Neluwa	0.53	1.15	0.59	
31		10	11	Empty	Morawaka	Neluwa	0.935	0.595		
	1		12	Empty	Morawaka	Galle	2.585	3.45	0.44	
39	1	6	111	Sand	Neluwa	Morawaka	0.53	1.835	2.44	
40	2	15	1.1.1	Empty	Neluwa	Morawaka	0.99	0.795		
41	2	1		Passengers	Morawaka	Galle	2.785	2.86	~ ~	
42	1	6	1.2	Empty	Morawaka	Neluwa	0.54	1.15	0.7	
43	1	15	1.1.1	Dossenders	Neluwa	Morawaka	0.59	1.395	0.815	
44	2	15	1.1.1	Empty	Neluwa	Morawaka	0.55	1.14	0.8	
45	2	15	1.1.1	Empty	Neluwa	Morawaka	1.1	0.89		
46	2	7	1.1	Empty						

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47	1	7	1.15	Dassonas					
48	2	8	1.2	Sand	Morawaka	Neiuwa	1.35	1.8	
49	2	8	1.2	Steel Prod	Neluwa	Morawaka	1.755	3.84	
50	1	15	1.1.1	mpty	Ivieegoda	Morawaka	1.245	1.1	
51	1	6	1.2	mpty	Kotapola	Neluwa	0.56	1.12	0.65
52	2	6	1.2	Empty	Morawaka	Galle	2.6	2.75	
					Neluwa	Morawaka	2.84	3.565	

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Note:

Direction :

1- Neluwa

2- Morawaka

Appendix – D
Middle,	1ft Away from	Corner
	64 in	

				04 111						
		+								
0	16	32	48	64	80	96				
48	1	2	3	4	5	6				
96	7	8	9	10	11	12				
120	13	14	15	16	17	18				
144	19	20	21	22	23	24				
168	25	26	27	28	29	30				
180	31	32	33	34	35	36				
180										
192	37	38	39	40	41	42				
204	43	44	45	46	47	48				
216	49	50	51	52	53	54				
228	55	56	57	58	59	60				
240	61	62	63	64	65	66				
252	67	68	69	70	71	72				
264	73	74	75	76	77	78				
276	79	80	81	82	83	84				
288	85	86	87	88	89	90				
300	91	92	93	94	95	96				
312	97	98	99	100	101	102				
336	103	104	105	106	107	108				
360	109	110	111	112	113	114				
360										
384	115	116	117	118	119	120				
432	121	122	123	124	125	126				
480	127	128	129	130	131	132				
528	133	134	135	136	137	138				
540	139	140	141	142	143	144				

	+			-				
0	16	32	48	64	80	96		
48	1	2	3	4	5	6		
96	7	8	9	10	11	12		
120	13	14	15	16	17	18		
144	19	20	21	22	23	24		
168	25	26	27	28	29	30		
180	31	32	33	34	35	36		
180				2. 2				
192	37	38	39	40	41	42		
204	43	44	45	46	47	48		
216	49	50	51	52	53	54		
228	55	56	57	58	59	60		
240	61	62	62 63 64		65	66		
252	67	68	68 69 70		71	72		
264	73	74	75	76	77	78		
276	79	80	81	82	83	84		
288	85	86	86 87		89	90		
300	91	92	93	94	95	96		
312	97	98	99	100	101	102		
336	103	104	105	106	107	108		
360	109	110	111	112	113	114		
360								
384	115	116	117	118	119	120		
432	121	122	123	124	125	126		
480	127	128	129	130	131	132		
528	133	134	135	136	137	138		
540	139	140	141	142	143	144		

Corner

64 in



Test lase

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CAD!

Element No

Middle

				144	6	19	27	36	45	54		63	22	81	96	66	108	117	126	135	144	153	162	171		180	189	198	207	216
				128	60	18	26	35	44	53		62	11	80	89	86	107	116	125	134	143	152	161	170		179	188	197	206	215
	-			112	7	17	25	34	43	52		61	20	79	88	16	106	115	124	133	142	151	160	169		178	187	196	205	214
	orne		1	96	9	16	24	33	42	15		60	69	78	87	96	105	114	123	132	141	150	159	168		177	186	195	204	213
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				128	80	18	26	35	44	53		62	73	80	89	86	107	116	125	134	143	152	161	170		179	188	197	206	215
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