PROMOTION OF AN EFFICIENT AND EFFECTIVE URBAN PUBLIC TRANSPORT SYSTEM IN DAR-ES-SALAAM: THE CASE OF SHIRIKA LA USAFIRI DAR-ES-SALAAM LTD (UDA).

BY

E D G A R H E R M A N B E R E G E

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"This thesis is my original work and
has not been presented for a degree
in any other University."

"This thesis has been submitted for
examination with.....
approval as University Supervisor."

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ABSTRACT

The provision of public transport is a service to the community. Public transportation system is the most effective mode of travel that can enhance the mobility of people in Dar-es-Salaam city. The public bus in Dar-es-Salaam projects a poor image from its slow speed, infrequent and irregular runs, unreliable schedules, poor riding comfort, uncertain arrival times, long waits at bus stops, crowded vehicles etc.

The principal objective of this study "Promotion of an efficient and effective urban public transport in Dar-es-Salaam: the case of UDA" is to improve the quality of public transport in Dar-es-Salaam, to devise ways and means of optimising the use of existing mass transportation system in the city. As a corollary to this objective the study is intended not only to gauge the level of passenger load factor and assess the extent of utilisation of bus fleet and personnel and the level of regularity and reliability of bus services, but also to suggest remedial measures.

The first half of the thesis analyses the present

demand for travel by public transport and the limitation as well as the extent of the facilities available in Dar-es-Salaam. A study of the factors affecting travel, mode, frequency, purpose and other related aspects of travel by public transport (i.e. activity patterns in the city) is also made. From the present bus travel characteristics and present and future land use plans, the author has projected travel demand by public transport.

The study findings reveals that the expression of distance in terms of physical units such as miles or kms. does not convey the full significance of spatial separation of the various parts of the city owing to the fact that the level of congestion is different on different sections of roads. In other words, the study testifies that travel time should be regarded as a better yardstick for the purpose of measuring the distance between various parts of the city and through this it is possible to explore ways of increasing the efficiency of roadway by reducing travel time or increasing travel speed.

The second half of the thesis incorporates measures aimed at promoting public transport in Dar-es-Salaam including the introduction of traffic management schemes which are considered as ideal short term measures to tide over immediate exigencies and to facilitate efficient and safe flow of traffic to the existing network of roads by

making best use of the available facilities and instituting new management and operational techniques designed to make effective use of existing equipments and personnel in UDA, and the introduction of "new services" to diminish the disadvantages for the passenger in conventional public transport operation.

Appendix A is on the performance of public transport system in the city of Nairobi, Kenya. The study findings here reveals that in order for public transport system in Dar-es-Salaam to be successful, UDA must seriously organize and administer the training of its staff covering all areas of its operation (management, traffic and administrative, road staff, engineering, accounts etc.). At same time, in order to make the best utilisation of UDA drivers, conductors and mechanics, an incentive wage should be introduced immediately.

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CHAPTER 1

INTRODUCTION

One of the pre-requisites of the efficient functioning of a big-sized city like Dar-es-Salaam is the facility for movement of people, goods and services, quickly and economically. However, Dar-es-Salaam city is facing problems of inadequate mass transit facilities, traffic congestion, inadequate roads, increasing number of traffic accidents, insufficient off-street parking facilities, level crossings and mix up of fast moving vehicles with slow vehicles and bicycles and pedestrians. Due to unplanned suburban sprawl, the journey to work is becoming long, tedious time consuming and expensive.

The vital role Dar-es-Salaam plays to the rest of the country is well known. It is the principal manufacturing, commercial, institutional and transportation centre of Tanzania and it used to be the administrative centre until recently when the capital was shifted to Dodoma. Dar-es-Salaam has a primary zone of influence throughout the Coast, Morogoro and Tanga Regions of Tanzania. As the nation's main import, export and wholesale trade centre, it serves a secondary zone of influence covering the entire country. It is reasonable to expect that its influence on trade and commerce and social activities within this secondary area will be greater as communication links improve between Dar-es-Salaam and the rest of the country. Its tertiary zone of influence covers areas outside the country, particularly Zambia, Zaire, Rwanda and Burundi which depend on Dar-es-Salaam port, in one way or another, for export and import of commodities. With the completion of Tanzania-Zambia Highway and Tanzania-Zambia (Uhuru) Railway, growth in trade between Dar-es-Salaam and Zambia will be promoted.

At present there are more than half a million people in the city performing different activities and functions not only for the city itself but for the entire country and outside countries. Their activities depend mainly on the availability of adequate transportation service, and in this case urban public transport or mass transit facilities. This is so because about 90% of city dwellers depend on public transport. It is also true with other countries of the world both in the developing and developed parts. See Table 1 below. Most cities in the world are, and will be entirely dependent on buses for mass transportation. Even in cities with excellent subway systems, buses are practically indispensable.

Table 1: Modal Split of Motorized Trips in Selected Cities

City	Auto-mobile %	Bus %	Other Motorized %(1)	City	Auto mobile %	Bus %	Other Motorized %(1)
Kwala Lumpur	47	35	18	Hong Kong	22	55	23
Caracas	46	35	19	Mexico City (2)	19	65	16
Kinshasha	33	58	9	Bagota	17	71	12
Bangkok	29	59	12	Karachi	16	63	21
San Jose	23	74	3	Seoul	8	69	3
				Dar-es-Salaam	15	78	3

Source: Urban Transport, Sector Policy Paper, World Bank, May 1975, page 18.

Note: Data for this Sector are generally weak and not closely comparable.

1) Includes taxis, jitneys etc

2) Rail services are also important.

One of the most urgent tasks confronting Government and Party authorities in the region today is to maintain an adequate public transportation service in the city. Large segments of the

population in the region are denied convenient access to urban services and facilities because they lack personal mobility. Their freedom to move is impaired because of poor public transportation service and because they can't afford an automobile. The public bus in Dar-es-Salaam projects a poor image from its slow speed, infrequent and irregular runs, unreliable schedules, poor riding comfort, uncertain arrival times, long waits at bus stops, crowded vehicles and inadequate shelters. Factors such as comfort, convenience, frequency of service and reliability figures importantly in the evaluation of public transport system performance, in other words, the goal of public transportation planning is the fast, safe and economical movement of persons in the city. This goal has never been achieved in Dar-es-Salaam.

There has been a continuous flow of complaints by the public on the services rendered by UDA since the inception of the Company in 1950. Of late there has been much public complaints against UDA services. With restrictions and the recent clamp down on the purchase of private cars, Dar-es-Salaam residents will increasingly depend on UDA to meet their transport needs. With nationalisation of the Company in 1970 the complaints were expected to at least diminish as those charged with the operation of this public transportation system were expected to work with diligence and goodwill and the general public especially the passengers were expected to appreciate this.

Optimism was added when the Company was given full monopoly in 1974 with the abolition of private competitors in the city. But public discontent at the inefficiency and rapid deterioration of standards of services rendered by UDA thrives. The number of labour hours lost through late coming by Government, parastatal and private employees in the city is alarming. UDA has been a centre of debate whenever the Minister for Communications - UDA's parent ministry - presents budget speeches for the Ministry. The Tansania Worker's Union (NUTA) has also been deeply concerned about the inefficiency of UDA buses. The Government has been appointing new personnel to man top positions in the Corperation. Public complaints can be read in the daily papers.

See the cuttings attached. Every establishment in the city has convened at least more than one meeting a year to discuss exhaustively, problems of journey to and from work and everybody is pointing an accusing finger on UDA.

The party, Government and the Company itself has not remained passive over these complaints. Measures have been instituted to make sure that the Company earns a good reputation and does not collapse, but, nevertheless, these measures have proved to be inadequate. There is therefore a need to explore the possibility of introducing new concrete measures in a comprehensive manner rather than on a piece-meal approach.

1:1 CHOICE OF UDA AS A CASE STUDY

One of the forces which contributed to the author's choice of UDA as a study area is the belief that there is need to revitalise mass transport system in Dar-es-Salaam.

Considering the paramount need to keep the growth of individual modes of transport including bicycles at a desirable level, it appears to be inevitable to encourage mass transportation, particularly in the context of low per capital income of majority of Dar-es-Salaam inhabitants.

The results of the studies[1] conducted in several countries on comparative capacity figures and congestion factors relating to different modes of transport prove conclusively that if mass transportation is encouraged to a greater extent, relatively more efficient transportation, than at present can surely be ensured. Similarly, the findings of comparative studies on the overall cost of transportation for different values of modal split are also observed to be in favour of the investment on mass transport. Therefore, in order to achieve the desired transportation balance which is essential for an orderly urban growth, the individual form of transport should be made subservient to mass transportation system. It is in this context that the Dar-es-Salaam Master Plan has strongly recommended that public transport should be promoted.

An inefficient public transport system or bus delays in Dar-es-Salaam mean thousand of man hours in lost work. The nation, therefore, pays people for time not actually worked for. Some officials in offices have stopped warning their workers

Whither UDA services?

NDAY
EWS" 2/5/76

ERS and residents in and
d Dar es Salaam have been
iencing immeasurable de-
nd poor services of Usa-
M Company Ltd. Many of
ave written their feelings
situation in papers but
s there is no response
DA quarters.
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npany has done very little
improvement of ser-
In fact it is tempting
to speak of the company's
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's emphasis on check-
has paid for his ride
hasn't. I understand quite a good number of smartly dressed inspectors have been assigned this job. As a company this would be in order for it ensures rightful revenue. But in the wider perspective the same company may be doing a disservice to the nation if the whole process of issuing and checking tickets must necessarily result into under delays of the bus — as it now seems to be the case.

This process almost succeeded when workers were told to queue for buses in the mornings. But as it developed later the workers were getting impatient day after day as sometimes after they paid for tickets buses could not come in time.

Secondly, what could be the justification for almost irregular and poor services we experience on every weekend. Similarly who in the rank and file of UDA can tell the public why there are apparently fewer buses running in rainy mornings and at end of months. I have certainly failed to understand whether UDA transport schedules and timings have ever been followed at those points of time.

Thirdly, could the company be serving the public when its drivers exchange duties at such peak hours as 12.30 p.m. on Saturday? In whose interest then must scores of buses rumble at terminals like that one opposite East African Community Building along City Drive while yelling drivers and conductors take their turns of recess? This is done irrespective of the fact that Saturday 12.30 is the busiest hour of the week as practically all offices close and every worker wants to go home.

Lastly there are these so called OX-Express buses. How express these buses are I can't tell but my only question here would be in the absence of regular and reliable bus services in general how can we go express? Express service means by — passing some of the bus tops — in this case by-passing numerous other passengers who remain at those places for well over 1-2 hours waiting.

Sometimes it happens that the same bus comes by and goes by in the same manner twice before one can board an ordinary bus. What makes this whole operation funny is that these buses may not take passengers at all bus stops even if it is not full.

WHAT SHOULD BE DONE:

After enumerating all those weakness I have a few suggestions to make which I believe would alleviate the situation.

(1) UDA should devise another yet flexible system in which drivers and conductors can exchange anytime in cases of bus breakdowns. Along with this drivers and conductors may not break or rest at a terminal of their route when it is discovered that either of the trips has been delayed or skipped or when one or more of the buses on that route break(s) down. The effect of this system is obvious — to avoid further delays and continue to serve people who might have collected in great numbers along that route.

(2) So that what is said in (1) above is successful UDA should set up sub-offices (as small as milk kiosks) somewhere in the middle of major routes and instal inspectors there. For example one or two inspectors could be stationed at Magomeni Mapipa to man buses to and from Ubungo, Chuo Kikuu, Magomeni, Mwanayamala and Kinondoni.

These inspectors would be checking whether all buses run as scheduled while monitoring to the head office any would be breakdowns. Meantime, they would be checking for rightful payments for all riders. With this system drivers and conductors won't have to go all along to the head office or ring there if and when their buses develop problems.

(3) UDA should revise and make public its timetable which must put more emphasis on peak hours and weekends — i.e with 12.30 p.m. on Saturdays and evening services on Sundays topping the frequency of buses. Reasons for favouring Saturday have been given above, while Sunday evenings attract many more people — even those who have good access to other means of transport — to travelling by UDA buses.

(4) Introduce school buses immediately to alleviate pupils' transport problems which they now face.

(5) As a matter of good public relations the public should be informed of any impending problems in transport so that those who can afford other means should not waste their time at bus stops.

It is my sincere hope, and I think other people will back me up, that UDA authorities will consider my points and rescue us from further tortures.

CONCERNED PASSENGER

"DAILY NEWS" 11/5/76

CAN N.S. HELP UDA?

REFERENCE IS made to the First Vice President, Ndugu Aboud Jumbe's call or proposal that National Service should be given an opportunity to run commercial undertakings.

A lot has been said and written as far as UDA services are concerned but still UDA services are deteriorating and worsening instead of improving. This problem of Dar es Salaam city transport is long overdue. Dar es Salaam residents have decided to keep their mouths shut and pray hopefully and wait if God will one day rectify UDA's inefficiency and change for the better by following up the pretty time table they display to the public but which they don't follow.

The Government has so many times tried its best to intervene on this issue so as to make UDA implement out the given, that of rendering services to the residents of Dar es Salaam but all in all these have proved fruitless.

From the fact that Usafiri Dar es Salaam has failed to implement the mandate it has been given as stipulated in an Act of Parliament for the formation of UDA I suggest that National Service (JKT) be given this load of which UDA has failed to carry. To National Service this will not be a strange thing, since if you can recall in December 1972 when the defunct D.M.T. drivers laid down tools for a couple of days the National Service took over.

Servicemen who undertook a driving course did the driving of D.M.T. buses while other servicemen acted as conductors and collected bus fares without any problem. With the coming of these servicemen, people were very happy since there was no abusive language during that time which is the order of the day for UDA workers.

On the other hand, by having the servicemen rendering services on nation-building basis during their six months stay at Mgulani Camp (after having a six month military training in the Central Training Schools) we shall be trying to solve the question of overemployment in a parastal organisation like UDA which does not ensure parity between numbers and productivity. Our policy now, as far as employment is concerned, is that. We must ensure that employment is directly related to the work load.

G. WAMAINGU

Box 20378,
Dar es Salaam.

P.O. Box 9503,
Dar es Salaam

"DAILY NEWS" 17/5/76

KIMARA–MBEZI UDA SCHEDULE

IN SPITE of millions of words already expressed in the "Daily News" criticising the poor services rendered by UDA, nothing has been rectified. So let the right man be appointed instead. The present management seems not to care about the suffering souls of Dar es Salaam.

The question of UDA is like a toothache, the more you think about it the more it hurts. Sitting in office on comfortable chairs while everything is deteriorating is a grave sin. No matter what other people may call it, but honestly, it is a criminal act against the Dar residents.

Even if we kneel down and pray day and night, there is nothing the UDA administration can achieve. Let some one try now before it is too late. It is three months now since I have been visiting some parts of this City especially Kimara and Mbezi where many people have accepted the call on "Kilimo cha Kufa na Kupona," awaiting UDA buses for more than two hours especially on Saturdays and Sundays.

When people go there they tend crops. All I am asking the UDA General Manager is to pay more attention to the bus going to Kimara and Mbezi. I want you to observe this proverb: The hyena spoke to the rock to implement an impossible road but the rock did not implement it; the hyena spoke to the rock again but the rock kept quiet; then the hyena said Okay, even if you don't reply and implement it you have heard me. You seem to ignore your responsibilities, which I observe are the thanks of the donkey's kick.

What residents of Dar want are the facts in full. We do not want to hear empty words all the time. Unless you understand what lies behind the problem, you will not be in a position to resolve any issue because UDA problems have become a cancer in the heart of Dar es Salaam's people.

ANSELMI J. NERE

Dar es Salaam

"DAILY NEWS" 2/5/76

Oyster Bay is no longer an exclusive area, please

THE UDA pundits should be informed that the Oyster Bay area is no longer occupied by an exclusive car-owning community as was the case during the colonial period. The majority of the dwellers now are UDA customers.

Normally there are three buses, all numbered 31, Oyster Bay — Muhimbili, Oyster Bay — Kariakor, Oyster Bay — Mapipa There is also a relief bus Oyster Bay — Old Post Office at around 6.00; I think this caters for school children but surprisingly there is no such service in the afternoon when schools close for the day.

What is agonising in the Oyster Bay route is the irregularity of the frequency of the services, at times, complete absence of services for a stretch of more than three hours especially in the afternoons, and evenings. It is not infrequent that all three buses are seen running one behind the other in succession.

I can only relate one incident among scores of irregular services. One Tuesday 20.4.1976 scores of people on this route waited at the Msimbazi stop from 12.30 p m. to 6.30 without a single service to Oyster Bay. Some of us scrambled into a bus heading for Mikoroshini.

I learnt later that dozens of starving school children waiting at the Old Post Office stop were stranded for hours until they appealed to a sympathetic bus inspector who diverted an empty bus to Oyster Bay route. This was about 6.30 p.m. Later in the same evening there was a succession of services on this route when the demand was so low.

One is forced to ask; can't the inspectors use their common sense and provide relief services at the main stops when the demand is high? Why does one see empty buses running to and fro when prospective passengers are stranded at the stops? Why is it that UDA authorities are so insensitive to customers' please?

We would like to remind UDA that Oyster Bay is no longer an exclusive area.

J. Juma.

P.O. Box 9503,
Dar es Salaam

"DAILY NEWS" 22/5/76

Return Co-Cabs operations

MUCH HAS been said about UDA services in this city but there has been no action taken to alleviate the problem of transport. I may be repeating the same lamentations of our passengers.

UDA is state owned and it is the responsibility of the state to see that it functions effectively.

We hailed the introduction of Co-Cabs services but blindly enough, the UDA authority claimed a 6m/- annual loss due to the side by side operation with Co-Cabs. UDA is supposed to be socialist by action and not by mere words — putting more emphasis on problems of its passengers who will in turn contribute to the 6m/- loss if at all they will exist. But on the contrary, UDA is not socialist in deeds, but a mere profit monger.

Take for example, the UDA mini buses. Most of these are directed to Mwananyamala, Ubungo and Buguruni where at the same time these locations have the largest share in buses. At the same time residents of National Stadium, Mwenge, Mbezi areas have very few buses which at times are not even seen at all.

In buses we have blamed conductors, drivers, inspectors for their lack of initiative but still no improvement of any sort has been forthcoming.

For how long are we to be stranded at bus stands? For how long are we going to be late for work? And for how long are public institutions and private companies going to pay more for less jobs done by their employees?

I request the government to consider this issue seriously and provide us with anything worthwhile. Let the workers and administrators of UDA join hands with Dar es Salaam residents and sympathise with them.

Allow Co-Cabs to operate in Dar es Salaam Region until UDA improves its services. Allow UDA minis to operate at all corners of Dar es Salaam and not only from Kariakoo to Manzese.

Let the administrators put more buses on tarmac roads for city users. They are not in Ubungo depot for tourists to take pictures. May the peasants' cry reach those concerned.

MWALITUKE J.

Dar es Salaam.

KEEP OUT CO-CABS

"DAILY NEWS" 26/5/76

I STRONGLY oppose the idea of Co-cabs operating with UDA in Dar es Salaam as suggested by some of your readers.

Let us first find and suggest ways of making UDA render satisfactory services to the public. I agree that UDA services are not satisfactory but inclusion of Co-cabs in the Dar es Salaam routes is not a solution to the inefficiency of our company UDA.

We are still capable of carefully looking into UDA management and see what problems and where these problems are. Then whoever is responsible actions can be taken against him or them. Let us not be too weak to fight.

No wonder after the closure of private shops, when we get problems with our ujamaa shops, these people who cry for the inclusion of Co-cabs will come and cry for the re-establishment of private shops instead of suggesting ways of solving our problems.

Co-cabs is only interested in our money and of course when given chance it will find where people like J. Mwalituke (Daily News, May 19, 1976) resides and send many buses there so that it can be praised by them in the press and thus continue to try to outclass UDA. That is what Co-cabs is interested in — public support so that it can get a chance of operating in the city. I say, there is a campaign against UDA, being carried out day and night.

Co-cabs is capitalistic. That is why a Co-cabs conductor will not stop for one person if at the next bus stop there are many to fill his bus. They do not work in the interest of the public but money only. I do not see the right of Co-cabs being allowed to operate even outside Dar es Salaam if UDA can do even in difficulties.

On the UDA management I say, please state clearly if this is what you can afford to do for we Dar residents. If you can't go further from here, then you have failed.

H.I. MATUWIRA

P.O. Box 9423,

Dar es Salaam.

"DAILY NEWS" 3/6/76

Should Co-Cabs be kept out?

THE letter "Keep out Co-Cabs" in the "Daily News" of May 26 by Ndugu H. Matuwira should not pass without comment. In the first place I would like to ask Ndugu Matuwira whether he is a constant UDA boarder? If he says yes he is cheating us for I do not believe a person facing these critical transport problems could simply say keep out Co-Cabs because it is capitalist. Actually it should be the other way round for the passengers' sake.

The rest of us who usually rely on UDA are really suffering on UDA's expenses. I do not think that its a socialist way of thinking to consider the loss which UDA will encounter if Co-Cabs compete with it. This is quite wrong. We should first of all think about the people who are suffering otherwise we are cheating ourselves.

Ndugu Matuwira continues to say that Co-Cabs is only interested in our money! Are you sure that UDA is not interested in our money? How many times UDA drivers have left passengers running to catch a bus? How many times have the conductors provoked passengers? You are too biased Ndugu and most probably you are an UDA employee.

People all over the city are suffering because of UDA's inefficiency. I remember when Co-Cabs and the so-called "shillingi shillingi" were operating within the City, UDA were trying their best. But since then UDA has become very very inefficient.

What I would suggest is that let the authorities concerned take immediate action to improve their services plus allowing Co-Cabs to assist UDA. Don't think about the loss UDA will suffer. Think about the people who are suffering, people who are breaking their bones and losing their property while struggling to get an UDA bus which has been late for three or four hours.

UDA please help solve these suffering human beings — children, the old an the sick.

A. HAPPINESS

Box 2066,
Dar es Salaam.

"DAILY NEWS"
&
UDA 3/6/76

MAY I appeal to members of the public and the authorities concerned to take note of what I am going to suggest here.

Every morning at bus stops, peasants, workers and businessmen discuss the issue. And according to my observation, it seems as if noboby is caring about what is going on.

After scrutinizing the matter, I came to the conclusion that the Government should dissolve UDA. Then after that, we peasants and workers will look for our own means of transport while awaiting a new and beautiful company.

Will UDA riders give their opinions in order to give the Government a very high powered "green light" to take off.

MBOYA MAICO wa PAULO,
P.O. Box 796,
Dar es Salaam.

against frequent unpunctuality because of the bus problems. The issue therefore has stopped being an UDA Company problem. It is a national issue as it affects productivity for a good portion of the working population of Tanzania.

In carrying out the study the author was thus interested in finding solutions to the city's public transport problems. Some of the solutions have been suggested in the past and are still valid even now. But nobody seems to have come out or appreciated the most realistic short term measures.

1:2 PROBLEM AND ITS SIGNIFICANCE

The extent to which the services of UDA meets the level of expectations of urban dwellers in terms of such factors as comfort, convenience, accessibility to urban opportunities, frequency and reliability is not satisfactory. There is therefore the need to improve the quality of public transportation.

Very few users know how much expert knowledge and equipment, how much organisational skill, courage and initiative are required of the staff, from the General Manager to the most junior worker in running a transport company. It is not surprising therefore, that UDA is criticised time and again, whenever things do not go as they should even if they are beyond the Company's control. Criticism on UDA is inevitable, to some extent, since people utilise its services daily, and whenever they are inadequate this is a sound reason to lodge a complaint. Each passenger considers himself a customer and entitled to give criticisms and or positive comments.

1:3 OBJECTIVES OF STUDY

This research is geared to suggest ways and means of making the bus system as efficient and effective as possible. The study sets out to:-

(a) give a general description of the existing bus transportation system in Dar-es-Salaam Region including routes, service levels and degrees of utilisation.

(b) set proposals for extensions of existing system in the areas earmarked for development.

(c) suggest a more efficient use of existing public transport facilities and resources and how the integration of new facilities with the existing ones can be achieved.

(d) plan future development of UDA with respect to maintenance and operation.

(e) propose solutions to overall problems and determine priorities for specific action areas.

(f) ascertain whether the present bus study should be followed by a more comprehensive study of the public transportation system and if so define the objectives and scope of such study.

Having analysed all this it is the author's sincere hope that a proper public transportation system geared to provide safe, efficient and convenient movement of people into or out of, through and within Dar-es-Salaam Region will result.

1:4 RESEARCH HYPOTHESIS

The research hypothesis in this context is taken to mean the research problem, that is a set of propositions drawn by the author from previous knowledge, documents, researches or practical experience of the study area. The research hypothesis therefore serves three main purposes:

First, it helps to show why the need has arisen to carry out the research.

Secondly, the research hypothesis shows the kind of data to be collected in order to answer the research question.

Third, the research hypothesis may be useful in analysing the data. Accordingly, the following are the assumptions taken in the study:

(a) The population of Dar-es-Salaam will continue to grow despite the fact that the capital city has shifted to Dodoma. Dar-es-Salaam will still maintain its dominant position in the country in manufacturing, commercial, institutional and transportation spheres. Expansion of these functions/ activities has to be accompanied by growth in public bus services.

(b) Present road standards and network/pattern is inadequate to meet the needs of urban population and especially users of public transport.

(c) There is considerable lack of integration between public transportation planning and comprehensive land- use planning.

(d) UDA management is less innovative and adaptive in the day to day running of the Company.

(e) the financially sound level of UDA is threatened because of some problems beyond the company's control.

(f) The day to day functioning and activities of the two most strategic departments in UDA - Traffic and engineering Departments - are not well coordinated to achieve efficiency.

(g) There is insufficient recruitment, both quantitatively and qualitatively in UDA. This retards, among other things, attempts to make research and planning activities more efficient and to utilize research results in practice.

1:5 RESEARCH METHODOLOGY

The first set of studies undertaken by the author were on management and operational characteristics and possibilities for improvement and co-ordination in UDA. In order to obtain information on this the author conducted very intensive studies on the organization and day to day functioning of each Department in UDA - Personnel, Finance, Engineering and Traffic by directly working with UDA staff at the headquarters, bus terminals and on the routes during the period July-October 1975 and December 1975 - January 1976. Informal interviews were held with various Company employees. Information obtained from this and through personal observation it is possible to suggest areas of management and operational improvement and co-ordination urgently needed to facilitate bus service.

Studies on road standards and their characteristics in Dar-es-salaam including existing road traffic management and regulation policies was also made and forms an important part

of the thesis. Information so obtained enables us to determine ways and means of promoting public transport given the existing road conditions in the city. Proposals are made for the extension of existing bus system.

Another important source of information was obtained from the National Transport Corporation, Cowi Consult (Consulting Engineers and Planners), National Archives, Zonal Town Planning Office Dar-es-Salaam/Coast Regions and the Urban Planning Division of the Ministry of Lands, Housing and Urban Development. The information obtained from these establishments was in form of literature and maps.

All in all, the study comes out with two types of recommendations on improving bus service, first are short term measures that can be implemented in "One shot", secondly are measures phased over time according to a predetermined programme.

A small chapter is devoted on the operation of a better organised Nairobi - based Kenya Bus Services Ltd (K.B.S.) to give a comparative picture. UDA can learn a lot from the experience of K.B.S. and whenever possible borrow whatever is desirable.

Photographic illustrations have also been included to depict the conditions of the roads and road traffic and other important aspects of transportation in the study area.

1:6 REVIEW OF PREVIOUS STUDIES

Various earlier studies (3) on Dar-es-Salaam city services were made by three Consultancy companies during the period 1971-1974 and their reports are referred to and quoted here and there in the following chapters and a bibliography appears at end of thesis. As a summary, these studies are very general and do not really touch at the root cause of the public transport problem. The reports are not comprehensive and each normally concentrates on one aspect of the problem. As it is usual for studies made by consultancy companies, what happened is that the consultants went through a few files at UDA, collected some data, made very general observations, went back to their offices (in two cases located in Europe) and started writing reports of a general nature on the existing situation with hardly any concrete recommendations.

The author has raised the following crucial issues that were not covered in any form in earlier studies by consultants:-

(a) The lack of co-ordination between UDA and other agencies responsible for city planning and especially traffic planning. The author has come out with a proposal for the formation of a permanent body with representatives from various institutions to deal with overall transportation planning process in Dar-es-Salaam and particularly public transport.

(b) Specific subsidies for public transport since capital for expansion is one of the major problems of UDA. The author discusses the need for subsidies but also singles out its dangers in that it may bring management inefficiency.

(c) Introduction of incentive wage (bonus system) as an inducement to promote efficiency in the Company. To the author, this could provide a relief to the internal problems of UDA since we shall see that low degree of commitment by a good number of UDA staff and particularly those in the Traffic and Engineering departments can be explained by the absence of an incentive wage.

(d) Minimization of operating costs - appropriate methods and techniques are suggested by the author on how to keep down the day to day operating costs of the company.

(e) Recruitment and training.

(f) Reorganisation of the route network - the last study made by a consultant company recommended the reorganisation of the existing route network. The proposals were implemented by UDA but the whole scheme was abandoned after one and a half weeks of operation. The author comes out with a practical new routing and bus service system that takes into consideration a number of social and economic factors.

(g) Operation of UDA mini buses

(h) An analysis of the general strategy and policy recommendations and priorities for future management of public transport.

(i) Projected bus traffic generation by sectors/zones for year 1980 and projected fleet size up to year 1985.

1:7 LIMITATIONS OF STUDY

One of the shortcomings of this study is that no system of model or models is applied in the analysis. Models have been utilised by

many urban transportation studies but suffer from a number of defects.[2] Secondly, it was impossible to carry out field surveys of any nature since these require large manpower and finance, and such surveys are supposed to be carried out simultaneously, not at different times. However, the author has personally conducted bus travelling time survey especially in the congested Central Area (C.B.D.), and for all routes in the city by boarding buses. Other surveys on traffic pattern, passenger countings etc were covered by one of the consultant firms in 1973 and data is available.

In order to measure the safety standard of the existing bus street network the author made a study of accidents involving only UDA buses and Third Parties. It was impossible for the author to cover the same kind of thorough study for the entire city due to time limit. A parking survey was also made by the author on selected bus routes in CBD.

1:8 DEFINITION OF TERMS

Before we conclude this chapter it is absolutely necessary to define important terms applied in the thesis.

The clearer expressions "mass transit" or "collective transport" are often used in place of "public transport"; while "individual transport" may be used to describe "private transportation service". Private concerns can provide" public transport" as it is the case with Nairobi-based Kenya Bus Services Company and public concerns can also provide "public transport", UDA being a case in point.

Efficiency in public transport has many connotations. It implies efficient use of resources. Profitability is a measure of efficiency and it is the ratio of useful output to total input expressed in money terms. Thus, deficit is a sign of inefficiency. The most efficient situation or operation is that which produces our unit of output at the minimum cost.

An effective public transport system is one that can handle all the present demand for the movement of people in the city. In additio

factors such as comfort, convenience, accessibility to urban opportunities, frequency and reliability must be achieved.

REFERENCES:-

1 See for example, ''Promotion of Urban Public Transport'' European Conference of Ministers of Transport, December, 1973.

2 See for example, ''The Urban Transportation Planning Process'', Organisation for Economic Co-operation and Development, Paris 1971, Paper No. 1, The Social Context of Transportation Policy'' particularly page 30 where the author points out the significant limitation of the applicability of Transport models.

CHAPTER 2

URBAN ACTIVITIES AND THEIR DEPENDENCE ON PUBLIC TRANSPORT

2:0 INTRODUCTION

Transportation is essentially a service which enables people, firms and various other entities, to carry on activities at sites selected for these purposes in separated locations. Transit systems and their terminal facilities exist to make it possible for concentrations of people, firms and other human institutions to carry on their activities in different locations in space. A major consideration in selecting a location is the accessibility that any particular activity has to certain other activities. The very heart of transportation planning is concerned with the design of circulation systems which maximize accessibility for essential movements between linked activities giving due consideration to safety, comfort, and amenity as well as costs.

The aim here is to look into activity patterns in Dar-es-Salaam which will reveal centres of work, residence, recreation and a physical relation between these activities and the areas in which they take place. When examined as part of the total movement system, the relation between activity and bus route network becomes clear.

The degree of activity and the speed and mode of movement is related to specific functions at certain scales. At the macro or city scale the main city functions of work, living and shopping and at the micro scale the dwelling unit and its immediate environment and activities should be examined.

2:1 REGIONAL BACKGROUND STUDIES

2:1:1 LOCATION OF STUDY REGION

The Dar-es-Salaam Region (Map 1) came into being on 1/1/74 to bring under one administration all those areas which could be said to be part of the Dar-es-Salaam metropolis, but which were outside the previous city authority's limits.

Dar-es-Salaam Region is the smallest of the 20 Regions in Tanzania Mainland and was carved out of the existing Coast Region. It covers the area previously covered by the city and Msizima District, and consists of three districts, Kinondoni, Ilala and Temeke. It is roughly the shape of a right-angled isosceles triangle with two equal sides, roughly 55km in length running east-west and north-south and with the third and longest side of about 65km running parallel with the Coast. The northern extent is marked by the Mpiji river and the south by the Mwange. In total, the Region is estimated to be 975 sq.km in area of which 83 form the urban city area.

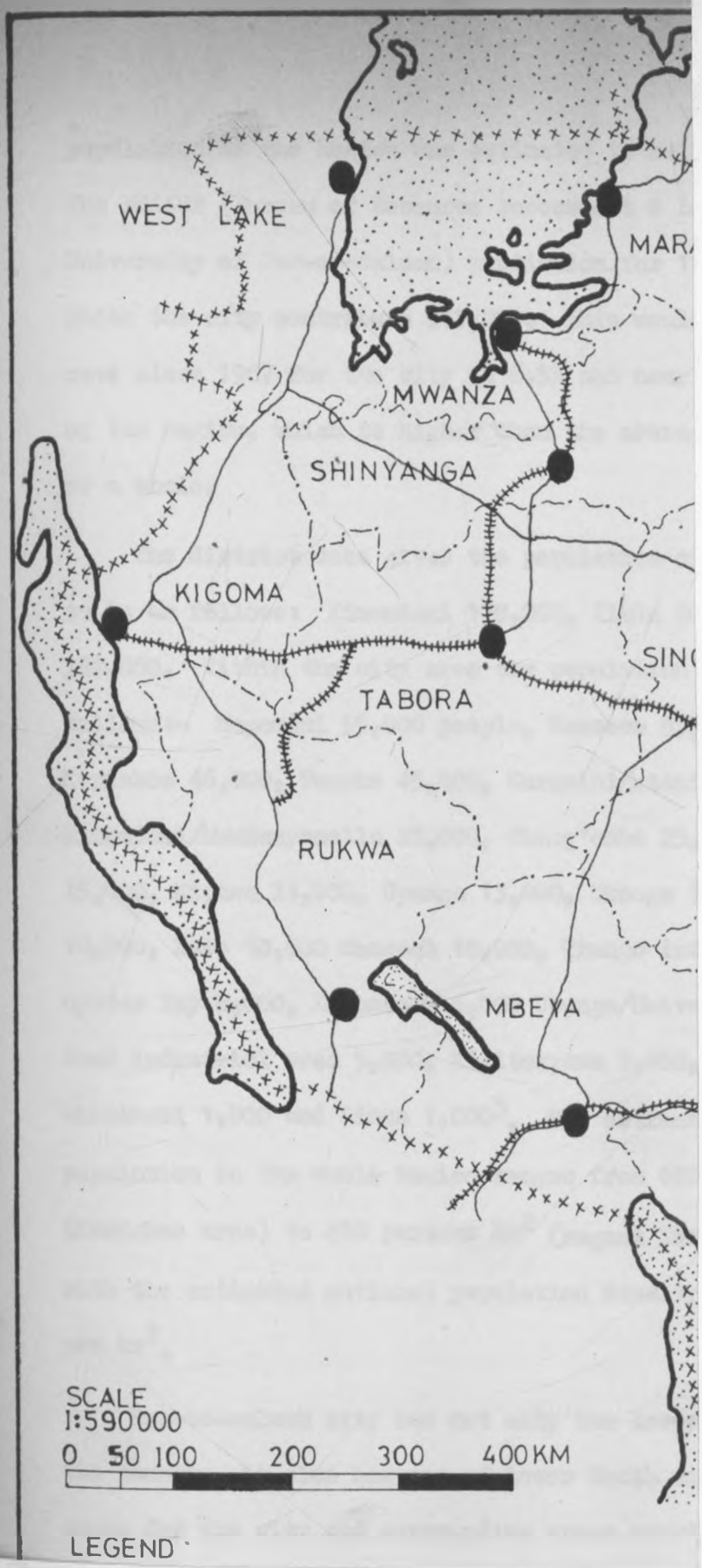
2:1:2 PHYSICAL STRUCTURE

Most of the Region is low flat coastal plain dissected by the Msinga creek which forms the Dar-es-Salaam harbour. Another river and creek, the Msimbazi flows down from the Pugu Hills which rise to about 240 metres (800ft) and form the western boundary. Along the Coast runs a shallow coral reef, which in places, forms islands.

2:1:3 POPULATION

Because the boundaries have only been recently established, there is no accurate measure of the population. However, taking the 1967 figure for the city and Msizima District together gives a population of 348,472. From information from the Districts the

MAP 1 DAR ES SALAAM NA



population of the Region was estimated to be 537,000 in 1974. The BRALUP (Bureau of Resource Assessment & Land Use planning of University of Dar-es-Salaam) prediction for 1975 is 637,000 of which the city contribute 517,000. This would suggest a growth rate since 1967 for the city at 8.5% and nearly 4% for the rest of the Region, which is higher than the average growth of the country as a whole.

The district data gives the population of each of the districts to be as follows: Kinondoni 178,000, Ilala 208,000, and Temeke 157,000. Within the city area the population is distributed as follows:- Magomeni 55,000 people, Mnsese 53,000 Buguruni 46,000, Kariakoo 46,000, Temeke 45,000, Kurasini/Mtoni 39,000, Ilala 29,000, Kinondoni/Mwananyamalla 25,000, Chang'ombe 23,000, City Centre 15,000, Kipawa 14,000, Upanga 13,000, Ukonga 12,000, Vingunguti 10,000, Kawe 10,000 Msasani 10,000, Ubungo industrial area 9,000, Oyster Bay 8,000, Kigamboni 6,000 Ubungo/University 5,000, Pugu Road industrial area 5,000, Kijitonyama 3,000, Regent Estate 3,000, Mikocheni 1,000 and Sinza 1,000[3]. The estimated density of population in the whole Region ranges from 652 persons per km^2 (Kariakoo area) to 410 persons km^2 (regent Estate). This compares with the estimated national population density of 16 persons per km^2.

Dar-es-salaam city has not only the lowest birth rate in the country, it also has one of lower death rates. The major cause for the city and surrounding areas growth is the massive immigration, both from other Regions and from neighbouring countries.

Table 2 and 3 below gives a clear picture of growth of population in Dar-es-Salaam and age - sex composition. Map 2 shows the physical growth and expansion of the city from 1886 to 1975.

TABLE 2: DAR-ES-SALAAM POPULATION GROWTH AND COMPOSITION

YEAR	TOTAL	AFRICAN	ASIAN	EUROPEAN	OTHERS	SOURCE
1886	4-5,000	5,000	207	-	-	Kitcheners estimate
1894	11,000	9,000	1,620	400	-	Deutsche Colonial Blatt estimate
1900	20,000	18,000	1,480	360	—	- " -
1913	22,500	19,000	2,500	1,000	-	- " -
1921	24,600	20,000	4,000	600	-	Census
1931	34,300	24,000	9,000	1,330	-	Census
1943	45,100	37,000	11,000	1,100	-	Estimates based on hut count
1948	62,227	51,000	16,270	1,726	466	Census
1951	99,140	72,000	22,547	3,603	660	Census
1957	128,742	92,300	29,986	4,479	914	Census
1964	180,000	-	-	-	-	City Estimate
1967	272,000+	-	-	-	-	Census
1974	462,400*	-	-	-	-	

+347,000 within City Planning Area

*462,400 within City Planning Area

Sources: (1) Gillman C.G, Dar-es-Salaam 1860 - 1940, in Tanganyika Notes and Records, Volume 20, 1945 page 22

(11) Leslie J. A., A Social Survey of Dar-es-Salaam, London: Oxford University Press 1963 page 70

MAP 2

URBAN GROWTH OF DAR ES SALAAM 1891 – 1975

SOURCE DSM MASTER PLAN 1967
EDGAR H BEREGE, DEPT. OF URB
& REGIONAL PLANNING, UNIVERSITY
NAIROBI 1975/76

TABLE 3: AGE - SEX DISTRIBUTION 1967

AGE GROUP	MALES		FEMALES	
	Number	Percentage	Number	Percentage
0-4	19,849	13.6	20,191	17
5-9	14,199	9.3	15,411	13
10-14	10,209	7.0	9,471	8
15-19	14,209	9.5	13,616	11.4
20-24	17,503	13.0	15,453	13
25-29	20,841	14.5	15,174	12
30-34	14,467	9.6	9,530	8
35-39	12,652	8.2	6,834	5.6
40-44	7,274	4.6	4,236	3.4
45-49	6,260	3.8	3,308	2.7
50-54	3,667	2.7	2,399	2
55-59	2,326	1.4	1,258	0.9
60-64	1,734	1.0	1,307	1
65-69	984	0.6	712	0.5
70-74	567	0.1	567	0.3
75+	1,591	1.0	1,505	1.2
Total	148,421	100	119,972	100

Source:- Census Report, Tanzania, 1967

Table 2 shows that from 1887 to 1943 the rate of growth of Dar-es-Salaam was relatively stable except for a period between 1900 and 1920 when it decreased slightly. This is probably accounted for by a decrease in - imigration caused by World War II. In the period from 1943-1957 Dar-es-Salaam experienced a rapid rate of population increase. In this 14 year period the population increased by approximately 84,000 persons or 186%. In the nine year period from 1948 to 1957 the total increase was about 85%. Between 1948 and

1967 (the last census year) Dar-es-Salaam experienced the highest increase in population, 293.6%. This is compared to a national increase for the same period of only 63.5%. At all times between 1948 and 1967 Dar-es-Salaam contained at least three times the population of its nearest rival, Tanga. In fact, by 1967, the population of Dar-es-Salaam was over four times that of Tanga, indicating that it will retain its position as the largest city for some time to come.

Table 3 above shows population structure by sex and age. A large proportion of population is in the school going age group between 5-24 years. There is a relatively large proportion of working age population (20-54 years) while there is a decreasing number of old people. This is characteristic of urban population due to migration of people from rural to urban areas in search of employment. The total of men and women differs in few hundreds. The city has a working age population 60%. The sex ratio for Dar-es-Salaam city as a whole was approximately 125 males to 100 females.

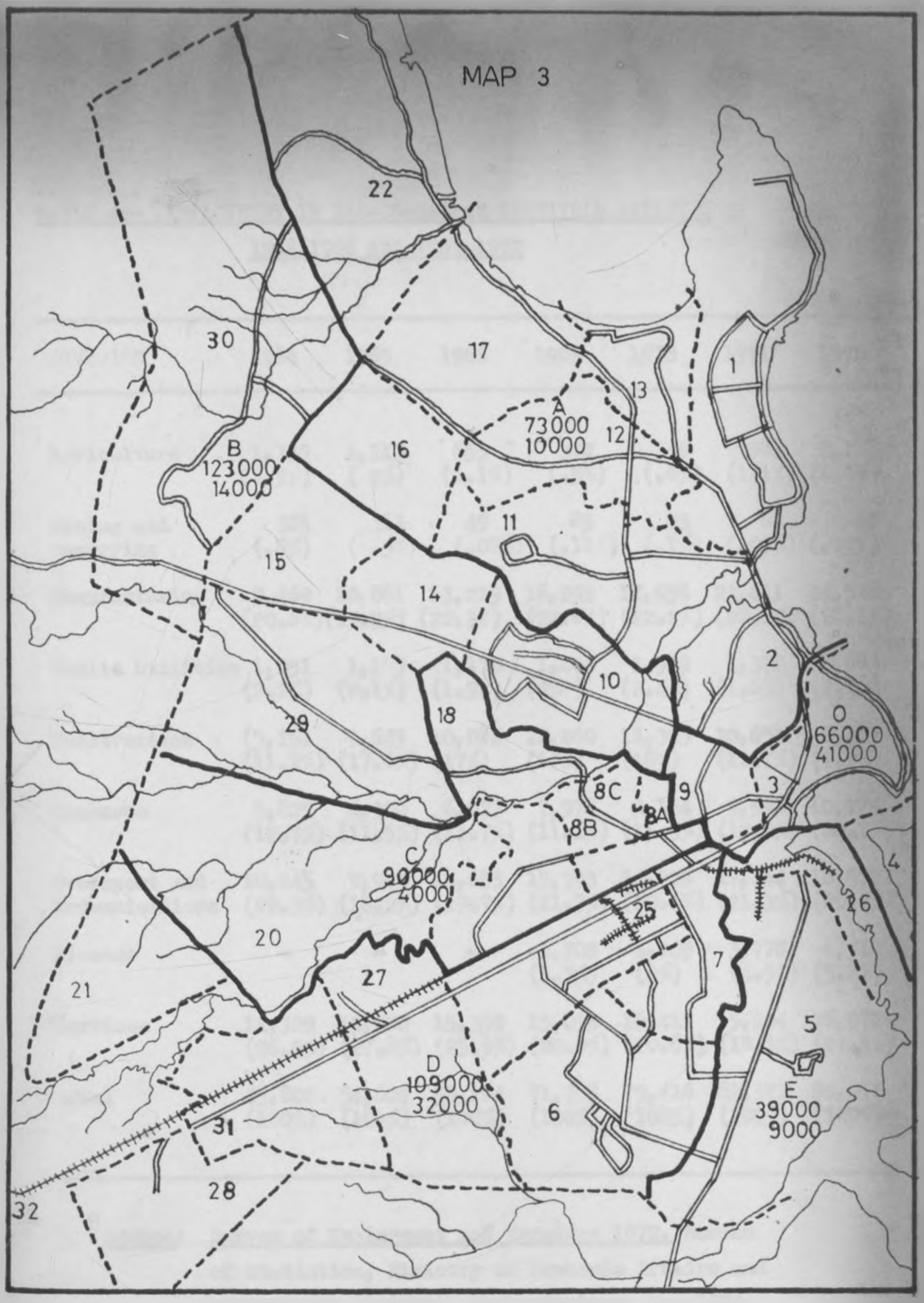
2:1.4 EMPLOYMENT

The latest information on the structure of the labour force in Dar-es-Salaam is set out in Table 4 below for year 1972 and Map 3 for year 1973. The figures refer to total employment including regular and casual labour. In 1972 the five largest employment categories namely Manufacturing, Construction, Commerce, Transport/Communications and Services accounted for over 72,000 or over 90% of the total.

Table 5 illustrates the employment position of Dar-es-Salaam vis- a - vis other Regional capitals in the country.

We can deduce the following facts from Tables 4 and 5 and map 3.

(a) Manufacturing - this includes all establishments engaged in the production, assembly or repair of any article or thing. By 1972 there were 245 manufacturing



LEGEND

190000 POPULATION 1973
32000 EMPLOYMENT 1973

A B C D E O ANALYSIS SECTORS

1 2 3 4 etc ANALYSIS ZONES

SECTOR BOUNDARY

ZONE BOUNDARY

SOURCE COWICONSULT REPORT 1973
EDGAR H BEREGE, DEPT OF URBAN & REGIONAL PLANNING, UNIVERSITY OF NAIROBI 1975/76

TABLE 5:- LOCAL RECORDED URBAN EMPLOYMENT BY INDUSTRIAL DIVISION 1972

Town	Agriculture	Mining & Quarrying	Manufacturing	Public Utilities	Construction	Commerce	Transport & Communications	Finance	Services	Total
Arusha	403	5	3,782	433	1,146	1,260	1,011	224	2,291	10,565
Bukoba	292	-	1,978	307	302	1,435	111	77	2,378	6,880
Dar-es-Salaam	1,178	62	22,518	1,683	6,387	10,175	16,579	4,517	16,972	80,071
Dodoma	395	223	151	1,616	690	368	641	48	1,322	5,454
Iringa	196	-	838	59	778	408	1,271	56	1,870	5,476
Kigoma	293	-	6	151	478	168	1,080	35	648	2,859
Lindi	50	-	94	27	990	210	78	53	414	1,916
Mbeya	211	12	195	771	1,450	412	736	96	2,492	5,975
Morogoro	680	15	2,180	344	4,626	318	949	61	3,355	12,528
Moshi	-	319	1,880	1,046	1,489	1,064	615	231	3,005	9,649
Mtwara	180	-	829	193	1,204	757	1,131	52	1,373	5,719
Musoma	348	-	87	21	838	298	291	44	2,249	4,176
Mwanza	209	11	2,776	873	732	1,413	1,598	164	3,347	11,123
Shinyanga	97	-	88	12	1,336	132	185	60	907	2,817
Singida	53	16	24	337	389	222	38	29	562	1,670
Tanga	193	-	10	23	340	197	27	31	823	1,644
Tabora	567	-	424	438	3,110	309	1,161	59	1,973	8,041
Tanga	489	16	2,205	692	1,573	1,258	2,790	197	3,215	12,435
Total	5,834	679	40,065	8,636	27,858	20,404	30,292	6,034	49,196	188,998

Source:- Survey of Employment and Earnings, 1972 Bureau of Statistics, Ministry of Economic Affairs & Development Planning, Dar-es-Salaam, May 1974, Appendix (XXXI) page 74

firms in Dar-es-Salaam comprising 33% of the total manufacturing firms in the country. The total estimated employment for these 245 establishments is 22,518 or 56.2% of total national urban employment in this sector. The food products and textile and wearing apparel firms employ nearly half of the Dar-es-Salaam manufacturing labour force. Only a few of the manufacturing firms are totally export oriented. The principal market area for most of them is within Tanzania although some of them market their products to Kenya, Zambia, Uganda and other African and overseas countries. However, Dar-es-Salaam provides the largest market for most of the goods sold in the country.

There are six industrial sites in Dar-es-Salaam area - Pugu Road/Chang'ombe, Ubungo, Ceresani/Kurasini/Nkrumah Street, Kawe, Wazo Hill and Kigamboni.

(b) Commercial Services - commercial services cover all wholesale and retail establishments, co-operative marketing, restaurants and hotels. Using this definition the Dar-es-Salaam's total employment in this sector in 1972 was 10,175 people or 49.8% of total national urban labour force in this sector. At present the Central Area contains most of Dar-es-Salaam's commercial development. Minor exceptions are (i) wholesale businesses located in association with the warehousing areas, (ii) Upanga's small commercial district including tourist hotels, (iii) a new shopping centre located in Oyster Bay, (iv) numerous small shops located in high density residential areas and (v) service stations along the main traffic arteries. The largest public market in Dar-es-Salaam - the shillings 23 million/ ultra modern Kariakoo market - is located in the Central Business District.

(c) Transport and Communications- This sector is the third largest employer after Manufacturing and Services sectors. Includes all establishments engaged in stevedoring, clearing and forwarding, land, water and air transport and posts and telecommunications. Included are also storage and warehousing allied to transport, East African Cargo Handling Services and construction by the East African Railways Corporation in so far as it is a service to existing transport services.

The major warehousing and railway/dock areas are concentrated in Kurasini and area south and west of the intersection of Morogoro Road and City Drive. A limited amount of warehousing is also located in the Pugu Road/Chang'ombe area and the new Ubungo industrial area. The north-west portion of Gerezani is the location of Government public works stores and vehicle depot. In 1972, 16,579 people were employed in Dar-es-Salaam accounting for 54.7% of national employment in this sector.

(d) Construction - all establishments engaged in the construction and maintenance of roads, buildings and other works. This sector employed 6,387 people in 1972 accounting for 22.9% of the national urban labour force in this sector. There is no significant trend in new building construction since the 1971 Acquisition of Buildings Act was passed nationalising all buildings worth more than Shs:100,000/-.

(e) Services - (including community, social and personal services). All establishments providing educational, health, veterinary, recreational, cultural, personal, household and other related services, welfare institutions as well as business, professional and labour associations are also included. Total employment in this sector in 1972 was 16,972 or 34.4% of national urban labour force in this sector.

(f) Agriculture - all establishments in agricultural activities - crop husbandry, livestock, forestry and fishing. Manufacturing of agricultural products. Although agriculture plays a major role in the economy of Tanzania, its coverage in the employment and earnings statistics is not complete. In Dar-es-Salaam city 1,178 people were employed in this sector in 1972 accounting for more than 20% of national urban labour force in the sector. Fishing is a very important activity in Dar-es-Salaam.

(g) Mining and Quarrying - of little significance in Dar-es-Salaam. Includes all establishments engaged in mining, alluvial digging and quarry. Total employment in the sector is 62 people accounting for 9% of national urban labour force in this sector.

(h) Public Utilities - electricity gas and water. All establishments engaged in the production and supply of electricity, gas and water including the Water Department and Irrigation Division of the Central Government. Total employment in this sector is 1,683 people accounting for 19% of national urban labour force in the sector.

(i) Financing - (including insurance, real estate and business services). Al financial institutions (i.e. banks, other credit institutions and financial services); insurances, real estates and business (e.g advocating, accounting, auditing, book-keeping, data processing and tabulating service). Total employees in Dar-es-Salaam are 4,517 people or 74.8% of total national urban labour force in this sector.

2:1:5 COMMUNICATION

Altogether, the Region has 848 kms of roads of all sorts of which 514 kms are all - weather roads. Many of the roads however, are in poor condition. The Region serves as the focus for much of the road network for the country, with the Kilwa Road from the Rufiji and the south, the Pugu Road, the Morogoro Road which forms the first part of the Tanzania-Zambia highway and also branches off to the north, and the Bagamoyo Road. The termini for the Central Railway line to the west of the country and the Tanzania-Zambia Railway line to Zambia are both within the Region. Dar-es-Salaam has also the main international airport and the country's chief seaport.

2:1:6 FUTURE OF URBAN LIFE IN DAR-ES-SALAAM

The policy of decentralisation has not only prescribed the growth of industry in Dar-es-Salaam in favour of the other major towns in the country, but has also led to the proposed removal of the capital to Dodoma. Inevitably this will mean not only the loss of many branches of the Government organisation but also the loss of headquarters of industry and a large section of the foreign governments' contingents. At the same time, with the increased port facilities and better road and rail communications with neighbouring countries, industry and commerce are likely to grow.

Finally, although it is proposed that the capital should move in the next ten years, it is unlikely that all the affected activities mentioned above will move immediately and it would seem safe to say, therefore, that the Region is likely to grow at much the same rate as before for the next ten years or so.

2:2 THE NEED FOR PUBLIC TRANSPORT IN DAR-ES-SALAAM

2:2:1 HISTORY OF UDA

Dar-es-Salaam City Services was introduced as a result of a recommendation contained in a 1949 new plan for the city by Six Alexander Gibbs and Partners. The original bus company was The Dar-es-Salaam Motor Transport Company Ltd. (D.M.T.) and changed its name to UDA in 1974.

DMT Ltd, was incorporated on 22nd June 1949 to start a Public Bus Service in the city of Dar-es-Salaam. The operation commenced with two buses on 1st November, 1949, and increased to nine buses by the end of that year. The Company which was responsible for the management and operation of the DMT Services was the United Transport Overseas Ltd (U.T.O) of Britain until the nationalisation of D.M.T. on 1st April 1970.

The DMT Company Ltd, played a leading role in establishing public passenger transport in Tanzania by extending its town services to the country services, in 1953. After independence in 1961, there was public urge to participate in all forms of public enterprises. For this reason, the now defunct City Council of Dar-es-Salaam acquired 25% Share-holding in the Company in 1965. And on the 1st April 1970 DMT was nationalised by the Government by purchasing the remaining 75% of the shares which were the property of U.T.O.

According to transport experts,a transport concern in developing country like Tanzania cannot be run properly when it has a fleet of more than 300 buses. Considering this important factor, the National Transport Corporation (parent company of UDA) decided to split its subsidiary transport company (DMT) into two companies on May 1st, 1974, one to deal with City Services - Shirika la Usafiri Dar-es-Salaam ompany Ltd

(UDA) and the other with country services - National Bus Services Company Ltd. UDA was granted monopoly by the Government to operate public transport in Dar-es-Salaam in September 1974 with the abolition of "Thumni Thumnis", the Tanzania counterparts of Kenya "Matatus".

2:2:2 ORGANISATION OF UDA

In order to achieve efficiency and effectiveness, the Company is organised along four Departments each with specific duties and responsibilities: Personnel, Accounts, Traffic and Engineering Departments.

On top of the hierarchy is the General Manager who is the overall incharge of the Company.

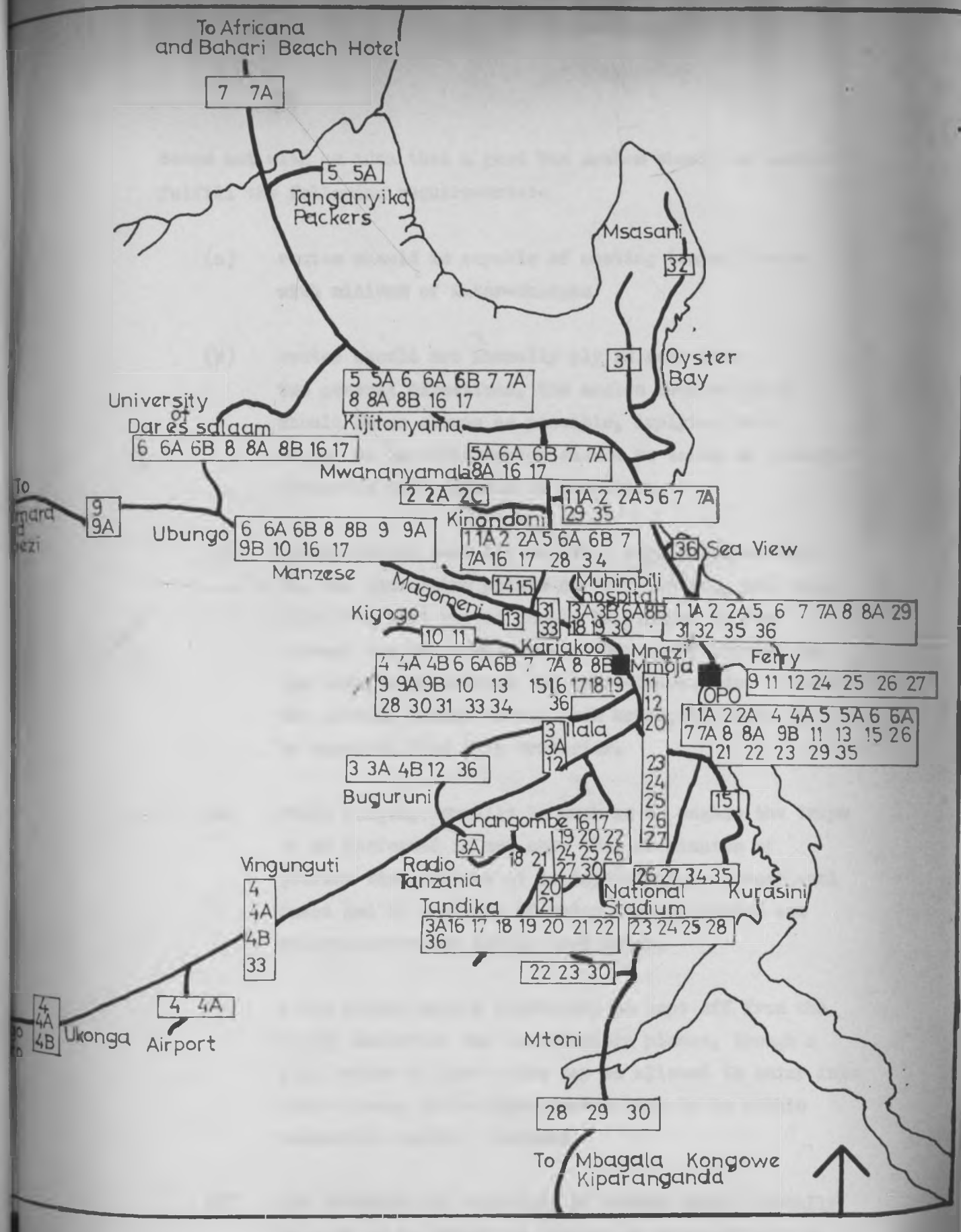
2:3 EXISTING ROUTE NETWORK - ITS RELATIONSHIP TO PLACES OF WORK AND RESIDENCE

The form and shape of the city of Dar-es-Salaam, with a population of about half, a million people is decisively influenced by its natural setting. The location of the city on the sea in relation to the country finds its expression in the main traffic routes radiating from the city. The existing road network of Dar-es-Salaam is a radial system - Bagamoyo Road, Morogoro Road, Pugu Road and Kilwa Road representing the spokes. There are also circumferential links. The radial road system gives the Central Business District (CBD) a special advantage in accessibility but on the other hand this has created capacity and parking problems.

2:3:1 PRESENT PATTERN OF UDA ROUTES

Map 4 shows the existing bus routes in Dar-es-Salaam. After making a comparative study of bus routing system of Kenya Bus Services (K.B.S) in Nairobi and UDA in Dar-es-Salaam, the author

4 EXISTING BUS ROUTE PATTERN



MAIN SCHEDULING CENTRE

BUS ROUTE AND SERVICE NUMBER

BUS SERVICES ORIGINATING, PASSING OR TERMINATING ALONG THIS ROUTE

EDGAR H BEREGE, DEPT OF URBAN & REGIONAL PLANNING, UNIVERSITY OF NAIROBI 1975/76

comes out with an idea that a good bus system should at least fulfill the following requirements:-

(a) routes should be capable of meeting travel desire with minimum of inter-changes

(b) routes should not normally ply in more than two general directions, the angles between which should be as obtuse as possible, implying that as far as possible routes should be taken in straight direction with minimum of deviation.

(c) routes should normally be sited beyond rather than at, the converging points of city centres, and this signifies that routes should be planned to run through the CBD areas rather than being allowed to run into them; however the split-in-services to meet the special demand during peak hours will have to be exempted from this criterior.

(d) route length, normally be such as to enable the trips to be performed in not more than 40 minutes of journey time, unless it is imperative in exceptional cases and in the case of outer village routes and split-in-services during peak hours.

(e) a few routes should prefarably be kept off from the highly congested and inaccessible places, though a good number of the routes may be allowed to enter into those areas, while other routes have to be within reasonable walking distance.

(f) the coverage and structure of routes should normally be such as to embody an element of diversification in the sense that routes originating from an important locality should have a dispersal character with diverse

connections to different types of land use, with no particular place having more than one or two direct connecting routes, unless it is too difficult to disperse them.

(g) all the neighbouring places of locality should, generally be linked with it by direct routes.

The section to follow is critical analysis of the bus route system in Dar-es-Salaam to see if it conforms to the above criterion. Table 6 below summarizes all the major features of the route system. The following is the author's definition of four main groups of activities performed in different zones of city. The activities are:

(a) Residential activities - includes all individual and household activities that take place in residential areas. Retail shops, produce markets, Schools (nursery, primary and secondary), dispensaries and clinics, small scale industry, recreation, bars, lodging houses, hotels, sports, religious activities etc.

(b) Commercial activities - wholesale and retail trade activities related to tourism, transport and communication, etc.

(c) Industrial activities - construction, manufacturing (refining, fabricating, assembly, storage and packing)

(d) Agricultural activities - cash and subsistence crop production and marketing, fishing.

(e) Institutional activities - Government, parastatal and private firms offices, embassies, financial institutions, religious, recreational, protective services and related activities (e.g. police, army, fire, courts), public safety and inspection services, public works and maintenance activities, labour, professional, welfare activities, political activities etc University of Dar-es-Salaam.

TABLE 6: MAJOR FEATURES OF BUS ROUTE SYSTEM

Service Number	Line	No of buses	Trips per bus	No of shifts	Round trip route length (km)	Travelling time (round trip hrs)	Main activities at zone of origin of route	Activities at intermediate zones	Main activities at terminal zone
1	Kinondoni–Old Post Office	1	29	2		.30	1	1	1,2,3
1A	Kinondoni–Old Post Office	2	32	2	17.4	1.0	1	1,2	–do–
2	Mwananyamalla–Old Post Office	4	30	2		1,05	1	1	–do–
2A	Mwananyamalla B–Old Post Office	3	38	3		1.05	1	1	–do–
2B	Mwananyamalla B–Old Post office	1	28	2	28.4	1.10	1	1,2	–do–
2C	Mwananyamalla B–Old Post office	2	34	3	28.4	1.10	1	1,2	–do–
2D	Mwananyamalla–Muhimbili Hospital	1	30	2	12.2	1.0	1	1	–do–
3	Buguruni – Manzese	2	26	2	22.2	1.30	1	1,2	1
3A	Buguruni–Muhimbili Hospital	1	30	2	13.6	1.0	1	1,2	4
3B	Temeke–Muhimbili Hospital	2	16	2	18	2.0	1	1,2	4
4	Sunguratex–Kariakoo	3	24	3			3	1,2	1,2
4A	Congo la Mboto–Old Post Office	3	26	3	36.4	1.30	1	1,2	1,2,3,4
4B	Kisarawe – Kariakoo	2	12	2	58.6	4.0	1,5	1,3	1,2
4C	Ukonga–Old Post Office	2	24	2	32.4	1.30	4,1	1,2	1,2,3,4
5	Kawe–Old Post Office	4	20	2	25	1.30	1,3,4	1,2	–do–
5A	Kawe–Old Post Office	2	26	3	25	1.30	–do–	–do–	–do–
6	University–Old Post Office	2	26	3	28.1	1.30	4	1,2	–do–

Table 6 continued

6A	University - Old Post Office	1	24	3
6B	University - Kariakoo	1	26	2
7	Africana-Old Post office	1	16	2
7A	Bahari Beach-Old Post Office	1	20	3
8	University - Old Post Office	1	28	3
8A	University - Old Post Office	1	28	3
8C	Manzese - Old Post Office	2	28	3
9	Mbezi - Kariakoo	2	16	2
9A	Kimara - Old Post Office	4	16	2
9B	Ubungo-Old Post Office	6	20	2
9C	Kibaha - Kariakoo	2	14	13
10	Kigogo - Manzese	2	30	3
11	Kigogo - Old Post Office	6	33	3
11A	Mabibo - Ferry	1	24	2
11B	Mabibo - Ferry	1	22	2
12	Buguruni - Ferry	5	33	3
13	Kimamba - Old Post Office	6	34	3
14	Kagera - Old Post Office	6	36	3
15	Shimo la Udongo-Magomeni Kondoa	2	30	3
15A	Magomeni Kondoa - Ferry	3	29½	2
15B	Shimo la Udongo - Old Post Office	2	37	3

28.1	1.30	4	1,2	1,2,3,4
28.2	1.10	4	1,2	1,2
94		2	1,2	1,2,3,4
91.6		2	1,2	-do-
28.1	1.30	4	1,2	-do-
28.1	1.30	4	1,2	-do-
17.0	1.30	1,2	1,2	1,2,3,4
42	2.0	5	1,3	1,3
35.8	2.0	5	1,3	1,2,3,4
22.6	1.30	1,3	1	-do-
108	3.30	4,5	1,3	1,2
23.8	1,30	1	1,2	1
13.2	1.0	1	1,2	1,2,3,4
15	1.20	1	1,2	4,5
15	1.0	1	1,2	4,5
14.8	1.0	1	1,2	4,5
17.4	1.10	1	1,2	1,3,3,4
17.4	1.10	1	1,2	-do-
17.4	1.0	1	1,2	1
14.2	1.0	1	1,2	4,5
13.2	.45	1	1,2	1,2,3,4

Table 6 continued

16	Temeke – University	2	20
17	Temeke – University	2	20
18	Temeke – Muhimbili Hospital	2	31
19	Tandika – Muhimbili Hospital	2	37
20	Temeke – Old Post Office	7	33
20A	Temeke – Kariakoo	2	39
21	Tandika – Old Post Office	5	32
22	Yombo – Old Post Office	1	32
23	Yombo – Old Post Office	1	33
24	National Stadium – Ferry	1	31
25	National Stadium – Ferry	1	31
26	Keko – Ferry	1	31
27	Keko – Ferry	1	31
28	Kongowe – Kinondoni	3	16
28A	Mbagala – Old Post Office	2	19
29	Kongowe – Kinondoni	2	20
29A	Mtoni – Old Post Office	2	30
30	Kiparang'anda–Muhimbili Hospital	3	10
31	Mapipa – Masaki	1	16
31A	Muhimbili Hospital – Masaki	2	28

3	42.6	2.0	1	1,2,3	4
3	42.6	2.0	1	1,2,3	4
2	20.9	1.0	1	1,2,3	4
3	20.9	1.0	1	1,2,3	4
3	17.4	1.10	1	1,2,3	1,2,3,4
3	12	1.0	1	3	1,2
3	23.5	1.10	1	1,2,3	1,2,3,4
2	18	1.0	1	1,2,3	-do-
2	18	1.0	1	1,2,3	-do-
2	16.1	1.0	1	1,2	4,5
2	16.1	1.0	1	1,2	-do-
2	14.7	1.0	1,4	1,2	-do-
2	14.7	1.0	1	1,2	-do-
2	49	2.0	5	1,2	1
2	36.2	1.30	5	1,2	1,2,3,4
3	49	2.40	5	1,2	1
2	18	1.10	5	1,2	1,2,3,4
2	108.6	6.20	5	1,2	4
2	17.4	2.0	1	1,2	1
3	38.8	2.0	4	1,2	1

Table 6 continued

32	Mapipa - Mikoroshoni	1	22	2
32A	Muhimbili Hospital-Mikoroshoni	2	22	2
33	Vingunguti - Mapipa	1	26	3
33A	Vingunguti - Ferry	2	20	2
34	Kurasini - Kinondoni B	2	20	3
35	Kurasini - Kinondoni B	2	17	2
36	Buguruni - Kariakoo	1	36	2
36A	Mikocheni - Muhimbili Hospital	2	24	2
36B	Muhimbili Hospital-Ocean Road Hosp.	-	-	-

Note:- Columns 8, 9, and 10:-

(1) Residential activities
(2) Commercial activities
(3) Industrial activities
(4) Institutional activities
(5) Agricultural activities.

17.4	1.0	1	1,2	1
26.6	1.30	4	1,2	1
-	1.30	1	1,2,3	1
21.2	1.30	1	1,2,3	4,5
33.2	2.0	1,3	1,2	1
33.2	2.0	1,3	1,2	1
11	.45	1	1	1,2
29	1.30	1	1,2	4
-	-	4	1,2	4

Statutory Planning Area
Existing Land Use

dustrial Areas

ailway and Port Areas

ublic and Private Open Space

acant Land and Land Used for gricultural

tatutory Planning Area Boundary

Residential

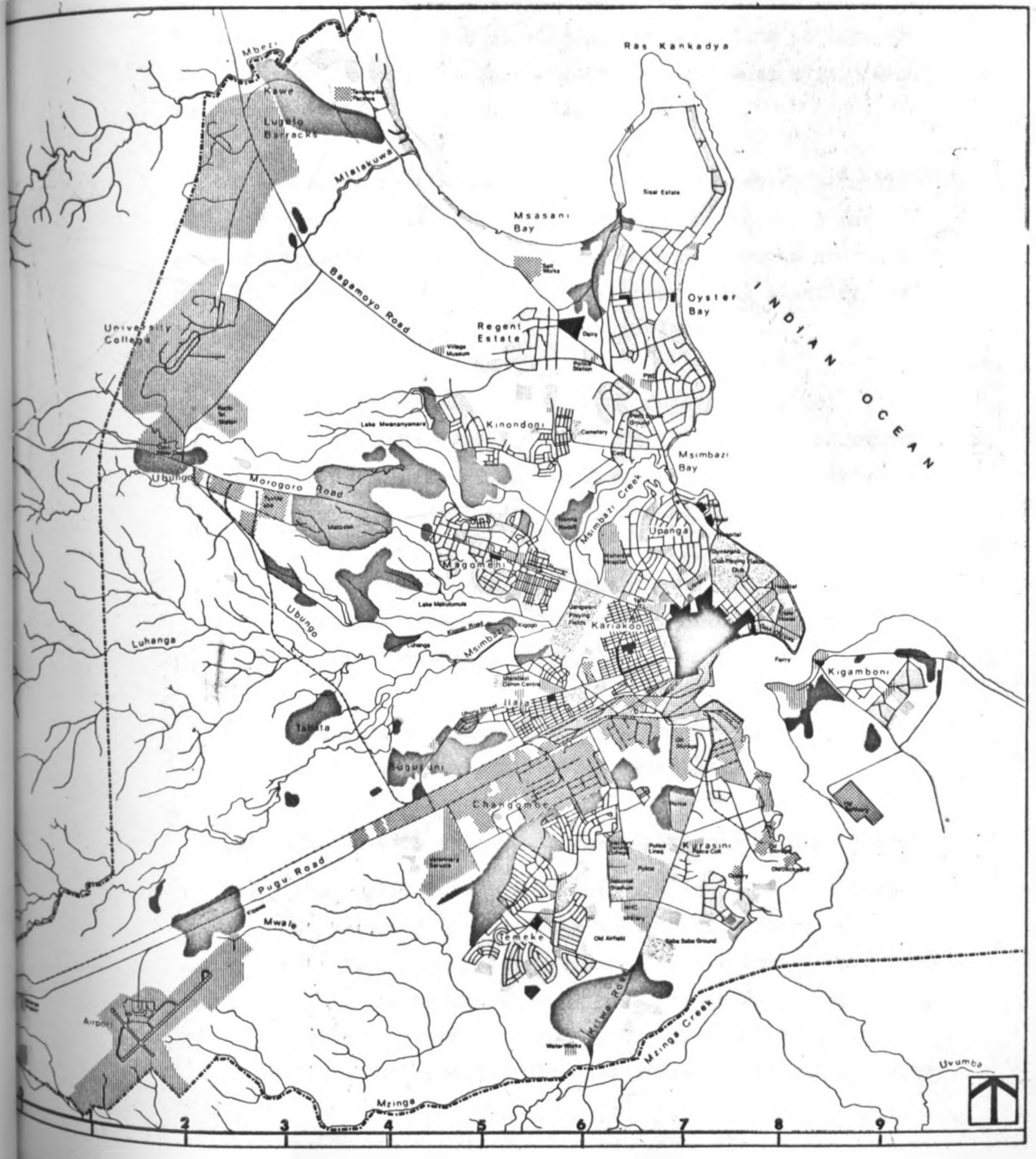
Predominantly Occupied by Squatters

Commercial Areas

Mixed Commercial–Residential Areas

Central and Local Government Offices and Institutional Uses

Educational Establishment



Overall, there are 36 routes. Some of these are divided into several services and currently there are 67 services. (See Column 2 above). For the period 1970-1972 UDA used to operate on 8 routes. Three new routes were added in January 1973, to make it eleven. Due to expansion of the city in terms of both population and physical size, the Company was obliged to expand her sphere of operation so as to cover new areas hitherto neglected by bus service and at same time to improve the existing routes. To this effect the new route system was introduced on 17th February, 1974.

If one compares the bus routes with the existing network of roads and population distribution as shown in Map 3 one gets the impression, and it is clear that the routes are well planned. From this map and Table 6 above we can identify the following characteristics of the bus routes:-

(a) They follow the better maintained main roads. These are the only four radial roads (Kilwa Road, Morogoro Road, Bagamoyo Road and Pugu Road) which radiate from the city centre to different parts of the country.

(b) Feeder bus routes are connected to radial roads to give easy access to residential, commercial, industrial and institutional areas.

(c) The network connects the six industrial districts with residential districts.

(d) The network extends to heavily populated districts.

(e) the routes interact at points which allow passengers to change from one route to another. There are only 2 interchange points or main bus terminals, Kariakoo, the CBD characterized by concentration of business, commercial, entertainment, cultural and political functions, and the Old Post office where the majority

of Government offices are located with (tourist) hotels, lodging, wholesale and retail trade etc.

(f) they serve both the inner city and outskirts and rural areas hence serving both rural and urban population.

(g) all residential districts have access to specialist medical facilities available at the main Consultant Hospital in the country, Muhimbili Hospital. There is also the Faculty of Medicine of the University of Dar-es-Salaam, Nursing Training Centre, School for training Laboratory Technicians etc at Muhimbili. If one looks at the frequency column - Table 6 column 4 above showing the number of trips per bus it can be seen that Muhimbili hospital is the only terminal route zone with the highest bus frequency. The hospital is supposed to be served with 430 bus trips per day by 18 buses from all corners of city.

The route system suffers from the following defects:-

(a) the system is now determined by the existing road network which has a low capacity and consists of only few roads in the main directions. As a result of this passenger flow can't follow the shortest way between centres of work and residence. This means the elongation of the travelling time as well as wasted kms, both of which affect productivity.

(b) some of the existing routes are unnecessarily long for example service Nos. 4B, 7, 7A, 9C and 30.

(c) several routes intersect the CBD which increases congestion in the area and reduces the operational speed, frequency and thus bears a negative influence on efficiency and effectiveness.

In Chapter 4 the author suggests the way the bus system should be re-organised given the existing road conditions in the city. Let us now see how the demand in mass transportation has been growing year after year.

2:4 TRENDS IN MASS TRANSPORTATION DEMAND

The extent of rising demand for mass transportation can be gauged from the fact that the average number of passengers travelling by UDA buses was 166,024 in 1949 and rose to 80,812,398 in 1974 after two and a half decades thus showing a steady increase from year to year.

This steady increase in demand is due to a variety of reasons some of which are:-

(a) Sprawling suburban area of city, increase in both the population and density, besides rising trend in employment which results in rising per capita income

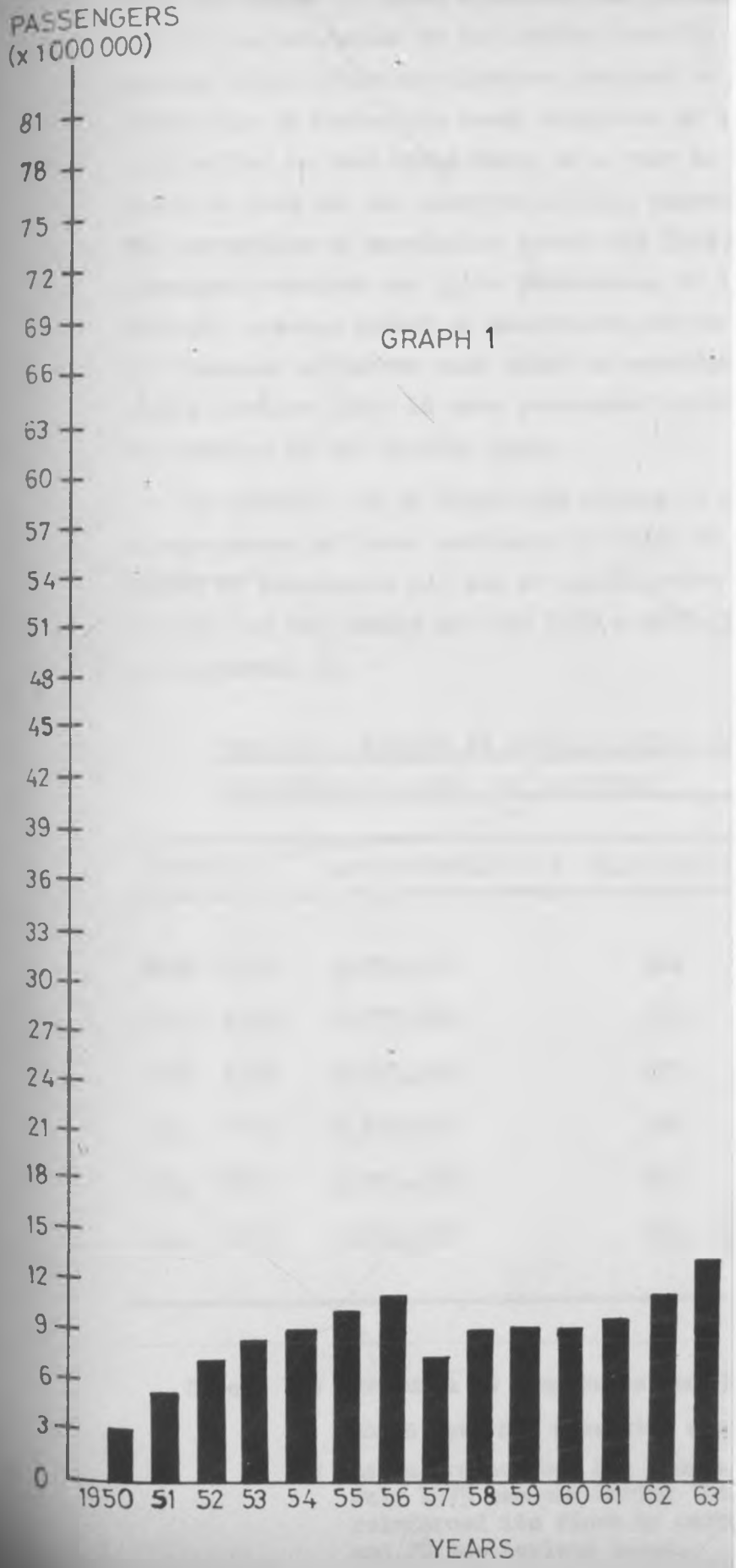
(b) concentration of work centres and recreational facilities in certain specific places away from the residential colonies in the suburbs and the increasing distance between home and work.

Graph 1 gives an account of yearly growth of operational features of UDA from 1949 - 1974.

2:5 DECLINE IN AVERAGE NUMBER OF PASSENGERS PER BUS AND PER SEAT MILE

Gradual expansion of UDA services during the period of 2½ decades is evident from the fact that the fleet strength of UDA has steadily risen from 9 buses in 1949 with total performed distance of 38,284 miles carrying 166,024 passengers to 288 buses in 1974 with total performed distance of 10,274,295 miles carrying 80,812,398 passengers. By July 1975 the Company

YEARLY GROWTH OF UDA OF
CITY SERVICES 1



GRAPH 1

had 374 buses. One can see that there has been an expansion in both the number of buses operating and passengers carried. But information extracted by the author from UDA reveals that, the average daily effective distance operated is going down, and especially so during the heavy expansion of the bus fleet. The implication is that while there is a rise in (i) the number of buses on road and the carrying/seating capacity provided, (ii) the proportion of population served and (iii) the number of passengers carried was quite phenomenon, it is a sad commentary that the average number of passengers per bus, per seat and per thousand effective seat miles is recording more or less a steady decline which is more pronounced during the latter years as compared to the earlier ones.

For example, if we divide the number of passengers carried by the number of buses available in order to find the average number of passengers per bus we shall arrive at the following figures for the months of July 1970 - 1975 (Table 7). See also Appendix B.

TABLE 7: DECLINE IN AVERAGE NUMBER OF PASSENGERS PER BUS PER SEAT MILE

MONTH/YEAR	PASSENGERS CARRIED	NO. OF BUSES	PASSENGER PER BUS
July 1970	5,054,071	114	44,333
July 1971	5,797,486	139	41,708
July 1972	6,725,092	175	38,429
July 1973	6,976,592	206	33,866
July 1974	5,951,046	221	26,927
July 1975	8,666,248	292	29,678

Note: (1) Includes 50 mini-buses and 34 Ikarus buses which were not operating during period.

(2) Passengers per bus has increased from 26,927 in July 1975 because during this period the Company reinforced its fleet by purchasing eight new Fiats and 20 new Leyland buses.

One of the reasons for this decline in number of passengers per bus between July 1970 - July 1974 can be explained by the fierce competition UDA faced from Thumni Thumnis so that seat occupancy ratio was low in UDA buses. The private buses were abolished in September 1974. The average number of passengers per bus has increased from July 1974-1975 because UDA is operating in a monopoly situation.

Secondly, a number of UDA buses are grounded due to technical failures and inadequate maintenance and servicing.

2:6 CHARACTERISTICS OF EXISTING BUS FLEET

The following are the characteristics of existing UDA buses:-

TABLE 8:

Vehicle make	Price Shs	Life Years	Fuel Consumption km/litre	permissible capacity (Passengers)	Capacity when Over Loaded	Fuel Type	Country of manufacture	Total No. of buses including those - recommended for scrapping
Leyland Albion CD-23 CD-25 CD-27	174533 Sept. 1974	8 (existing)	2.4	50 seats + 40 standing	140+	Diesel	Britain	108
Mercedes Benz of-14.13	91720 May 1972	6½ (existing)	2.5	50 seats + 40 standing	140+	Diesel	West Germany	66
Fiat 643E/1 643/E2 331A	209950 Sept. 1974	8 (existing)	1.8	50 Seats + 40 Standing	140+	Diesel	Italy	67
Ikarus 280	410000 Jan. 1975	5 (expected)	1.7	37 seats + 113 Standing	250+	Diesel	Hungary	32

Table 8 continued

Ikarus 266	280000 January 1975	5 (expected)	2.2	28 seats + 62 Standing	140+	Diesel	Hungary	51
Isuzu TLG 52B	70,000 October	4 (expected)	5	25 seats + 6 standing	40+	petrol	Japan	50
TOTAL OF ALL MAKES								374

2:6.1 DESIGN OF BUSES:

The Company is operating five different makes of vehicles comprising ten models. The Oldest introduced make is Leyland followed by Fiat. Benz was introduced in 1972. The recent makes are Isuzu and Ikarus. The following are some of the characteristics of these buses taking due consideration of such factors as riding comfort, convenience etc.

(a) Albion, Benz and Fiat - most of these buses are built in Dar-es-Salaam although the chasis is imported. Some of them are built in Nairobi. This results in the following advantages: Saving in foreign currency; cheap and sturdy construction; the construction can be adapted to local condition and specific wishes of UDA; the two different doors (entry and exit) allows faster handling (boarding and alighting) of passengers; more efficient checking of tickets by inspectors and makes work easier for conductor when issuing tickets; standardised super-structure, repairs are relatively cheap, size of tyres are same for front and rear wheels.

The following are the short-comings of the vehicles: the floor is high which leads to high and awkward steps, consequently it is difficult to get on the bus and a considerable amount of time is required for getting on and off at stops - an obstacle for old and decrepit people; relatively small windows giving rise to inadequate ventillation and consequently uncomfortable ride; no roof ventillators on these buses; the buses are equipped with only one rear view mirror on the outside this endangers safety, there is therefore need to have two exterior mirrors; a few of these buses have one door for both boarding and alighting passengers. This gives rise to delays.

(b) Ikarus - are manufactured for city and suburban services. Especially Ikarus 280 is designed for the peak hours on roads where a great number of passengers has to be transported simultaneous. The 280 is an articulated bus consisting of a two - unit vehicle. It has large capacity, low floor height for ease of passenger boarding and alighting, wide entrances and exits, roof ventillators and big windows, lower capital cost of vehicle and infrastructure including depots, greater flexibility of operation, more labour intensive operation greater elasticity of between demand and the introduction of additional buses, and higher local manufacturing labour input when these buses will be assembled in Tanzania as the Government plans to do so.

(c) Isuzu mini-buses- one man operation is a saving in operating costs, higher speed than maxi buses thus high frequency, very flexible, operate on any route where passenger load is high, have no route tables.

Because of shortage of buses in any day, overloading and overcrowding of passengers is the order of the day particularly during peak periods. Taking passengers in excess of permissible capacity is not conducive to the efficient operation of passenger

service, as it results in higher wear and tear and other operating cost of the bus on the one hand and extra delay and inconvenience to passengers as well as to running staff on the other.

2:7 CORRELATION BETWEEN BUS TRIP DEMAND IN DIFFERENT GROUPS OF ACTIVITIES AND AVAILABLE BUS CAPACITY

A number of bus traffic studies were undertaken by Dar-es-Salaam based Cowiconsult Company in June 1973, (Consulting Engineers and Planners) as part of an exercise in determining the provision and extension of bus services to five Site and Service areas in Dar-es-Salaam viz. Tabata West, Manzese North, Sinsa, Kijitonyama and Mikocheni.[4]

Their findings are of interest to us as Physical Planners since the data collected reveals the relationship between public transportation and land use and we can also deduce whether the bus service level is adequate or not in meeting the different demands of urban dwellers. On the whole UDA has not fully satisfied the travel demand of bus riders in connecting their activities in different land use areas.

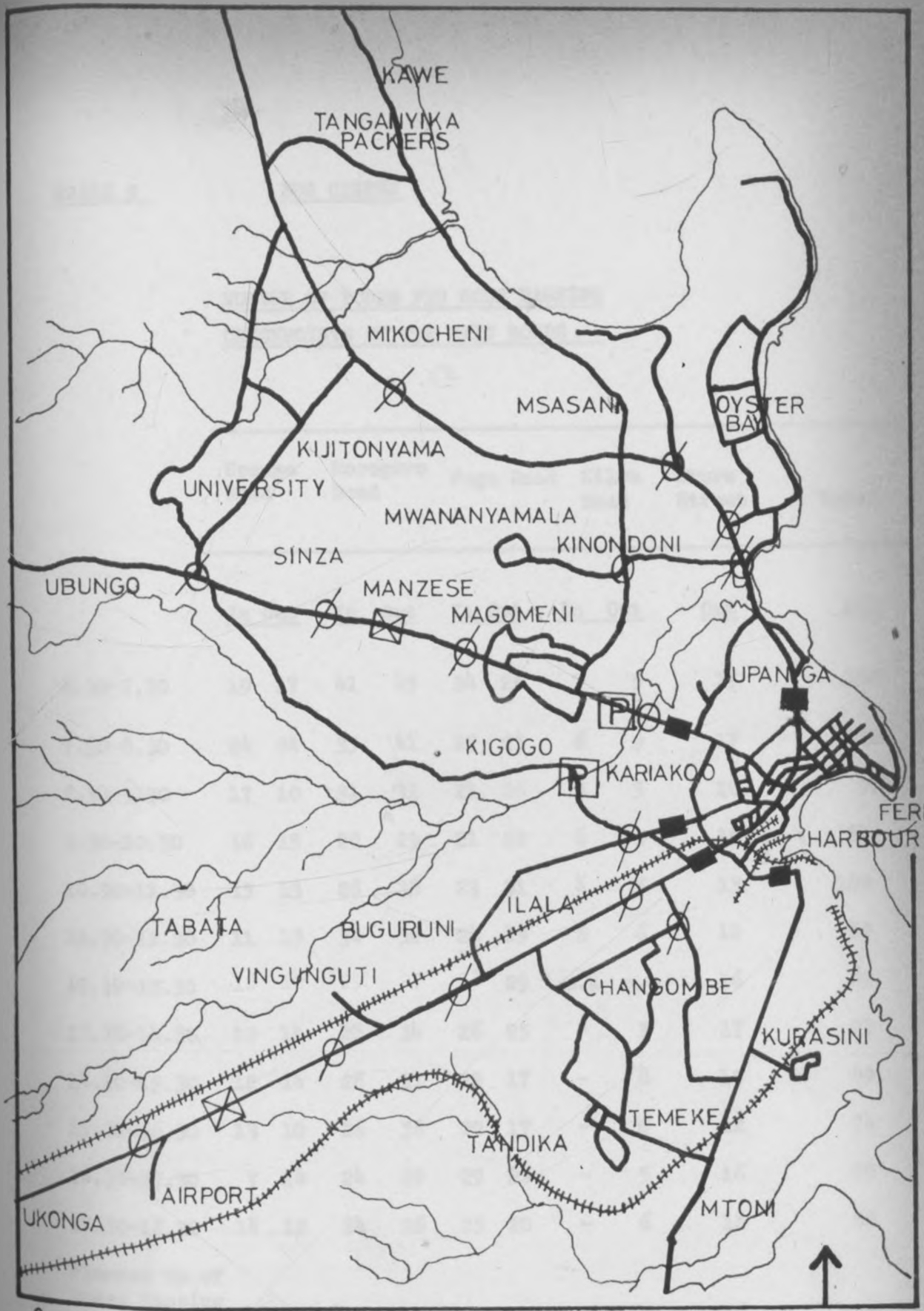
The following are their study findings. The author has tried to make some comments in areas of interest.

Map 5 shows the location of counting stations.

2:7:1 FREQUENCIES OF THE BUSES

From UDA timetables the expected number of buses per hour were calculated for the roadnet in Dar-es-Salaam. The frequences do not vary much during the day and in Map 6 is shown the then existing 1973 service with 167 buses operating. At several checkpoints the actual frequence was measured on the 6th, 7th and 8th June, 1973. For the 5 mainroads in Dar -es-Salaam, Table 9,

MAP 5 THE LOCATION OF COUNTING STATIONS



SOURCE COWICONSULT REPORT, 1973

LEGEND

CORDON LINE

P PEDESTRIANS.

SCREENLINE

BOARDING AND ALIGHTING PASSENGENGERS

EDGAR H BEREGE, DEPT OF URBAN & REGIONAL PLANNING, UNIVERSITY OF NAIROBI

1975/76.

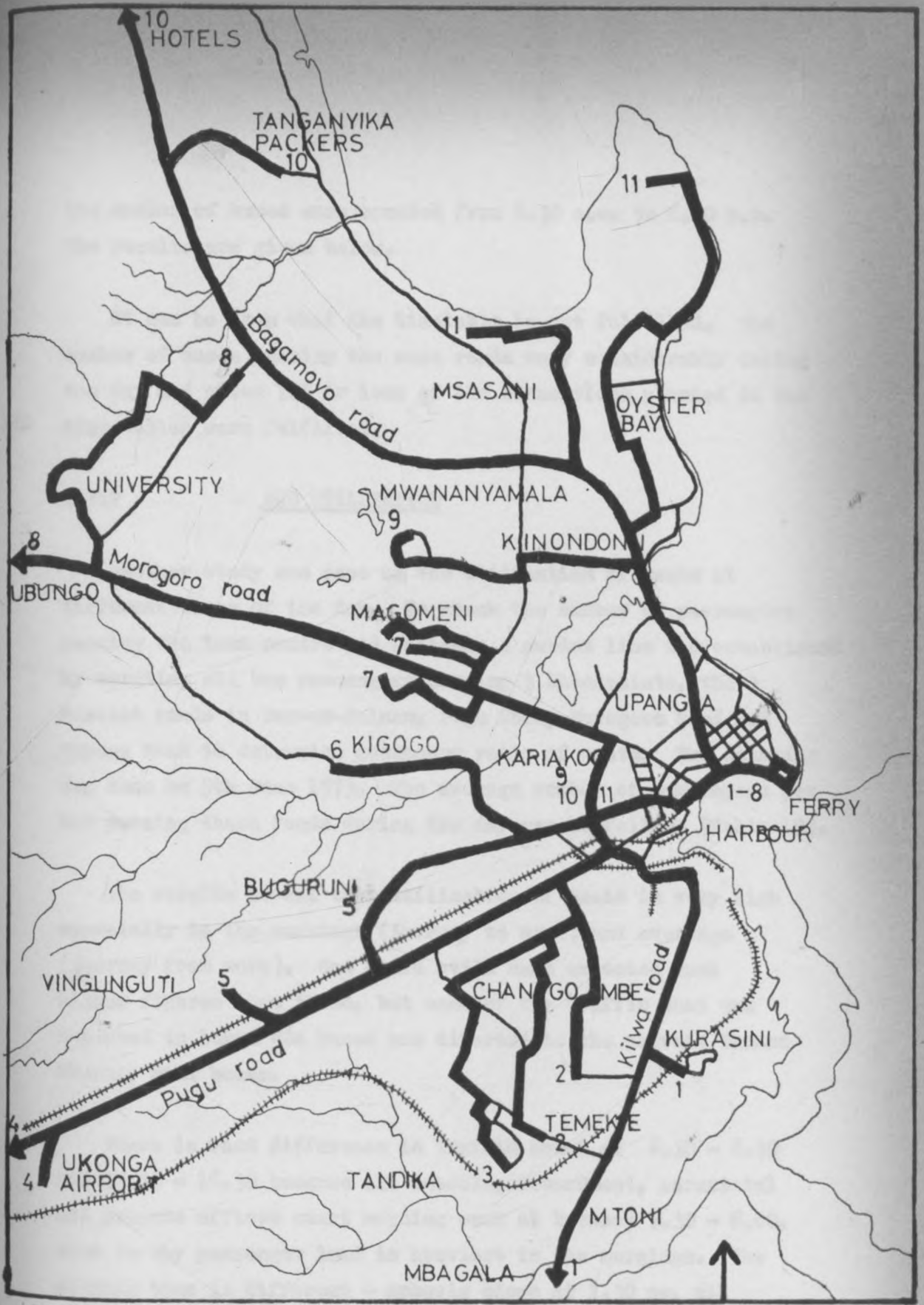
TABLE 9 BUS CENSUS

NUMBER OF BUSES PER HOUR PASSING CHECKPOINTS AT THE MAIN ROADS

	Upanga Road		Morogoro Road		Pugu Road		Kilwa Road		Uhuru Street	Total
	In	Out	In	Out	In	Out	In	Out	Out	Out
6.30-7.30	19	17	41	45	34	26	7	5	17	110
7.30-8.30	24	24	35	41	27	25	6	9	17	116
8.30-9.30	17	10	31	31	21	26	8	5	18	90
9.30-10.30	16	15	28	29	21	22	6	3	15	84
10.30-11.30	15	13	28	38	23	31	4	7	13	102
11.30-12.30	11	13	34	32	24	19	6	6	12	82
12.30-13.30	16	12	29	27	18	25	n.a	n.a	16	89
13.30-14.30	10	14	28	34	26	25	-	3	17	93
14.30-15.30	12	14	28	31	22	17	-	8	19	89
15.30-16.30	13	10	26	36	20	17	-	6	12	74
16.30-17.30	7	14	24	29	29	25	-	5	16	89
17.30-18.30	14	12	24	26	25	20	-	6	18	82
Planned No.of buses Passing at peak hour	24	24	44	44	32	32	9	9	20	129

The countings of the buses took place on the 6th, 7th, and 8th of June, and the buses in are not counted on the same day as the buses out.

MAP 6 BUS ROUTES 1973



SOURCE COWICONSULT REPORT 1973

EDGAR H BEREGE, DEPT OF URBAN & REGIONAL PLANNING; UNIVERSITY OF NAIROBI 1975/76

the number of buses were counted from 6.30 a.m. to 6.30 p.m. The results are given below.

It can be seen that the timetable is not fulfilled. The number of buses passing the main roads vary considerably during the day and often 70% or less of the connections planned in the time-tables were fulfilled.

2:7:2 BUS UTILIZATION

Another study was done on the utilization of seats at different times of the day. To check the number of passengers passing the town centre and Kariakoo a cordon line was established by counting all bus passengers passing 3 checkpoints, the 3 busiest roads in Dar-es-Salaam, Pugu Road, Morogoro Road and Upanga Road to determine occupancy ratio of seats. The counting was done on 5th June 1973. The average number of passengers per bus passing these roads during the day was as follows (Table 10).

The results reveal that utilisation of seats is very high especially in the mornings (journey to work) and evenings (journey from work). One would still have expected much higher figures than these, but some of the traffic that was expected to board UDA buses was diverted to the private Thumni Thumni, mini buses.

There is vast difference in traffic count of 6.30 - 8.30 and 17.30 - 18.30 because all schools, Government, parastatal and private offices start morning work at between 7.30 - 8.00, that is why passenger load is heaviest in the mornings. The closing time is different - schools close at 1.30 pm, all Government offices and some parastatals close at 14.30 and the rest and private offices close at 16.30hrs. That is why there is a more or less even distribution of passenger load from 13.30 - 18.30 hrs. for both town - bound and out of town traffic.

TABLE 10:-

Time	Number of Passengers		Number of Passengers		Average Number of Passengers per bus	
	In	Out	In	Out	In	Out
6.3o-7.30	8800	2500	94	92	94	27
8.30	7400	2700	86	90	83	30
9.30	4400	2800	69	67	64	42
1o.3o	5000	3200	65	66	77	48
11.30	4000	4000	66	82	61	49
12.30	3100	4400	69	64	45	69
13.30	3100	5600	63	64	49	88
14.30	4200	5700	64	73	66	78
15.30	3300	5400	62	62	53	87
16.30	3900	4900	59	66	66	74
17.30	3100	5600	60	67	52	84
18.30	3100	5600	63	58	49	104

2:7:3 TIME DISTRIBUTION

The daily traffic varies depending on the weekday, Saturday is the best day, Sunday the worst but the variation is only a small percentage. There are no seasonal variations in the daily traffic, but the number of passengers depend on the time distance from the pay day. Near the 15th (mid-month pay day) and 1st of every month the bus traffic is 10% above average. The variation of traffic during the day (peak and off peak) may be illustrated by the countings on the main roads, Upanga Road, Morogoro Road, and Pugu Road. At the checkpoints 106,000 passengers passed in both directions from 6.30 to 18.30 and as can be seen from Table 11 below and Graphs 3, and 4, the number of passengers carried is stable during the day with an average traffic of 8,800 passengers per hour in both directions. There is no peak hour in the afternoons 13.30 - 18.30 because schools and offices close at different times, distributing passenger load evenly. But also this is probably due to lack of bus capacity. As the graph for the traffic into town shows, the peak hour is from 6.30 to 7.30 in the morning. At that time the traffic into town is 8,800 through the three roads or 16% of the total traffic to town from 6.30 - 18.30.

2:7:4 BUS TRIP GENERATION

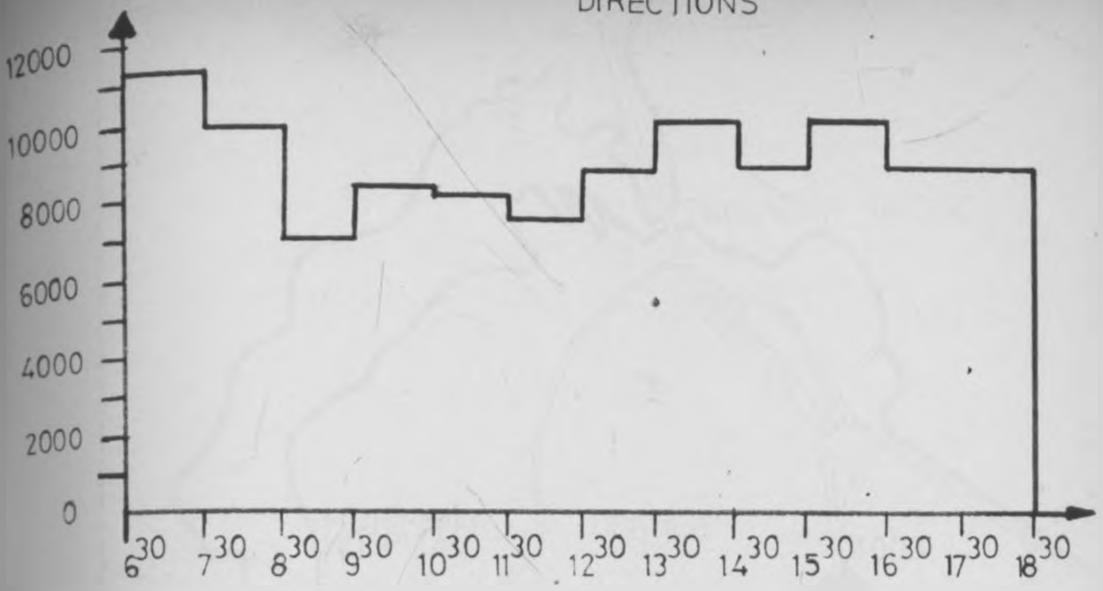
Based on different countings the number of busetrips starting and ending in each zone was estimated. The number of boarding and alighting passengers in each zone was recorded for 4 round-tours and the result multiplied by a factor according to the actual number of buses passing in the period. Also screenline countings were used for zones which were easy to isolate, for example, Oyster Bay, Mwananyamala and Kigogo.

Number of passengers per hour 6.3o - 18.3o

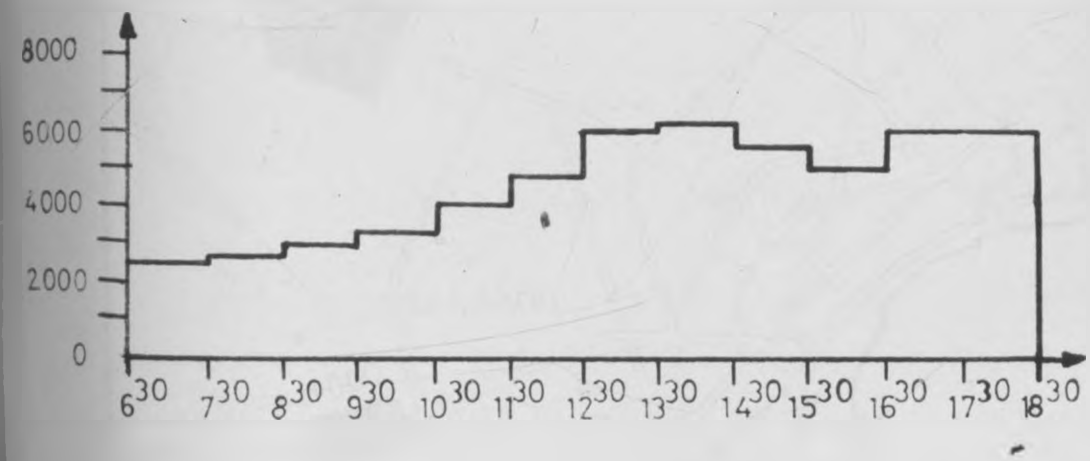
	Into town					Out of town				
	Pugo Road	Morogoro Road	Upanga Road	Total		Pugo Road	Morogoro Road	Upanga Road	Total	
6.3o - 7.3o	3ooo	4ooo	18oo	88oo	16.4%	12oo	6oo	7oo	25oo	4.7%
- 8.3o	21oo	33oo	2ooo	74oo	13.8	9oo	9oo	9oo	27oo	5.1
- 9.3o	13oo	22oo	9oo	44oo	8.2	11oo	12oo	5oo	28oo	5.3
- 1o.3o	17oo	24oo	9oo	5ooo	9.3	1ooo	14oo	8oo	32oo	6.1
- 11.3o	13oo	19oo	8oo	4ooo	7.5	15oo	17oo	8oo	4ooo	7.6
- 12.3o	1ooo	15oo	6oo	31oo	5.8	13oo	21oo	1ooo	44oo	8.4
- 13.3o	9oo	15oo	7oo	31oo	5.8	23oo	24oo	9oo	56oo	1o.7
- 14.3o	14oo	2ooo	8oo	42oo	7.8	21oo	24oo	12oo	57oo	1o.9
- 15.3o	12oo	15oo	6oo	33oo	6.2	16oo	26oo	12oo	54oo	1o.3
- 16.3o	11oo	19oo	9oo	39oo	7.3	14oo	26oo	9oo	49oo	9.4
- 17.3o	16oo	14oo	3oo	31oo	5.8	22oo	21oo	13oo	56oo	1o.7
- 18.3o	1ooo	15oo	6oo	31oo	5.8	19oo	25oo	12oo	56oo	1o.7
	176oo	251oo	1o9oo	536oo	1oo	185oo	225oo	114oo	524oo	1oo

THE NUMBER OF BUS PASSENGERS PASSING AT THREE CHECKPOINTS

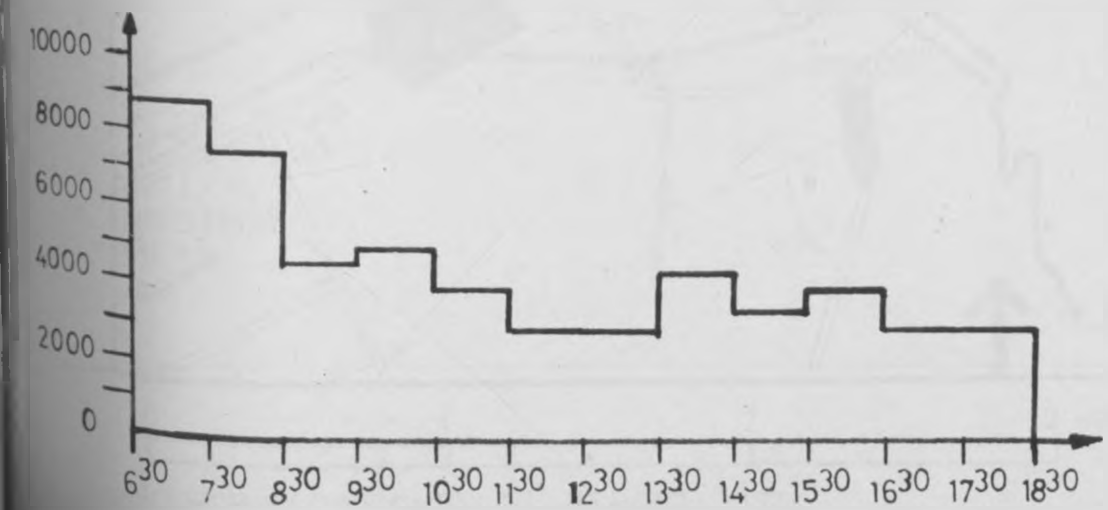
GRAPH 2 TOTAL TRAFFIC IN BOTH DIRECTIONS



GRAPH 3 TRAFFIC OUT OF TOWN

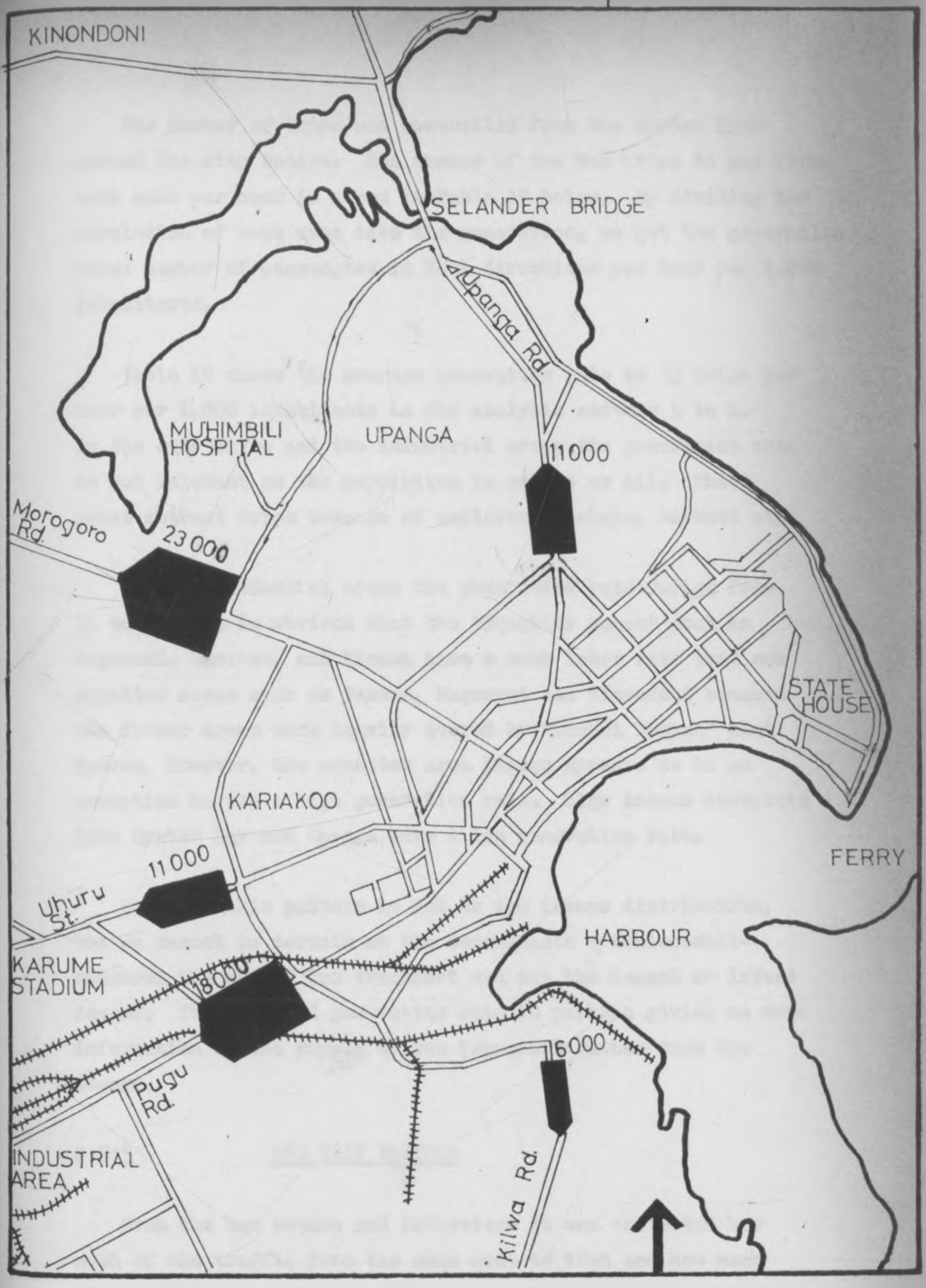


GRAPH 4 TRAFFIC INTO TOWN



SOURCE COWICONSULT REPORT 1973
EDGAR H BEREGE DEPT OF URBAN & REGIONAL PLANNING UNIVERSITY OF NAIROBI 1975/76

MAP NUMBER OF BUS PASSENGERS FROM TOWN 6.30am. - 6.30pm.



SOURCE COWICONSULT REPORT 1973
EDGAR H BEREGE, DEPT OF URBAN & REGIONAL PLANNING, UNIVERSITY OF NAIROBI 1975/76

The number of trips was controlled from the cordon line around the city centre. The number of the bus trips to and from each zone per hour is shown in Table 12 below. By dividing the population of each zone into the generation, we get the generation rate: number of passengers in both directions per hour per 1,000 inhabitants.

Table 12 shows the average generation rate as 33 trips per hour per 1,000 inhabitants in the analysis sectors A to E. In the city centre and the industrial areas the generation rate is not relevant as the population is scarce or nil. These areas attract trips because of employment, shops, markets etc.

In the residential areas the generation rate varies from 31 to 56. It is obvious that the "Squatter zones" such as Buguruni, Manzese, and Kipawa have a much lower rate than non squatter areas such as Temeke, Magomeni and Kinondoni because the former areas were heavily served by "Thumni Thumni" mini buses. However, the squatter area Kigogo appears to be an exception having a high generation rate. High income districts like Oyster Bay and Upanga have a low generation rate.

Probably this pattern is due to the income distribution, but we cannot be certain as the consultants - Cowiconsult- measured the actual bus transport and not the demand or latent demand. The measured generation rate is perhaps giving us more information on the supply of bus transport rather than the demand.

2:7:5 THE TRIP PATTERN

From the bus census and interviews it was estimated how much of the traffic from the zone went to town and how much was local in the sector. The travel pattern for the existing traffic was described by the following distributions of trips per hour:-

TABLE 12 Generated bustrips by areas outside town center

Zone		Population	Average number of buspassengers per hour: total	Average number of buspassengers per hour: town traffic	Generation rate buspassengers per 1000 inhab.: total	Generation rate buspassengers per 1000 inhab.: town traffic
1	Oyster Bay	8000	200	200	25	25
2	Upanga	13000	300	100	23	8
3	Centre	15000				
4	Kigamboni	6000				
5	Kurasini/Mtoni	39000	1100	800	28	21
6	Temeke	45000	2000	1600	44	36
7	Changombe	23000	900	600	39	26
8 A+C	Ilala	29000	1700	700	45	24
8 B	Buguruni	46000	1100	800	24	17
9	Kariakoo	45000				
10	Magomeni	55000	3100	2100	56	49
11	Kinondoni/Mwananyamala	25000	1200	1200	48	48
12	Regent Estate	3000	300	200	33	22
13	Msasani	10000				
14	Manzese	53000	1100	800	21	15
15	Sinza					
16	Kijito Nyama	3000	100	100	25	25
17	Mikocheni	1000				
18	Kigogo	15000	700	400	47	27
20	Tabata East					
21	Tabata West					
22	Kawe	10000	300	300	30	30
25	Industrial area Pugo R.	5000	1000	500	200	100
26	Port		300	100		
27	Vinqunguti	10000	200	200	20	20
28	Airport		100			
29	Ind.area Ubungo, NHC	9000	500	300	50	30
30	Ubungo/University	5000	600	400	120	80
31	Kipawa	14000	300	200	21	14
32	Ukonga	12000	400	300		25
Simple totals		500000		129000		26
Sector A-E		434000	14300	11400	33	26

Sector							Intern. sector
A	Bogamoya Road	73000	2100	1800	29	25	4
B	Morogoro Road	123000	4600	3900	37	32	5
C	Uhuru Street	90000	2500	1900	28	21	7
D	Pugo Road	109000	4000	3000	38	28	10
E	Kilwa Road	39000	1100	800	28	21	7
		434000	14300	11400	33	26	7

Between outer area and town	7,500	60%
Between outer areas via town (cross routes)	2,000	16%
Local traffic in outer areas along the main roads	3,000	24%
	12,500	100%

This means that of the generated 33 trips per 1,000 inhabitants at peak hour 25 will go to town, where 5 will change to another route, and the remaining 8 will get off the bus in the outer area. It is important to estimate the traffic which crosses the town to another sector as there is no ring route, this traffic would probably be moved from town to a ring road if such a road is built.

2:7:6 ORIGIN - DESTINATION SURVEY FOR BUS PASSENGERS

The final study made by Cowiconsult was to determine the origin and destination of bus passengers. The travel pattern could be found by interviews of bus passengers. There were consequently made interviews at bus stops all over the town in residential and industrial zones. The origin of the passenger was assumed to be the zone in which the interview was taken, and the passengers were asked the following questions:-

(a) to which part of the town do you intend to go now?
(b) at what stop do you leave this bus?
(c) do you change to another bus?
(d) if yes, to which route?

The most important was to have answers to question (a) and c. Question (b) was just a control question. The quality of the survey was not very high, there were some disagreements between the results of interviews and the countings. The sample was not representative, and the

interviews were taken by conductors after a short instruction. Before the material was tabulated, the interview sheets were examined and only 1,712 of the interviews of about 2,500 were used.

The final trip table is shown below, Table 13. The main purpose of the study has been to estimate the proportion of cross town traffic, the traffic from sector A or B to C, D or E.

2:8 PROJECTED FLEET SIZE

The augmentation of bus fleet by UDA is mostly done on the basis of availability of funds which are quite limited rather than on the basis of travel demand or systematic forecasting programmes. However, if funds are to be made available in ample measure a definite method of estimating the future requirement of fleet size ought to be evolved so that the growing demand for public passenger transport is taken care of. Hence an attempt is made by the author to arrive at as accurate figures as possible on future requirement of buses on the basis of

(a) city population (b) the number of passengers travelling by UDA buses per day and (c) the number of public transport buses on road per day.

One of the main factors influencing the increasing trend in UDA passengers is the growth in the population of the city. There is a definite relationship between the two, i.e. as the population increases, the number of passengers also increases.

Owing to the fact that the urban decentralisation policy is likely to be effectively implemented during the Third Five Year Development Plan 1975-1980, it is assumed that the Dar-es-Salaam population growth rate will be 6% per annum. With these assumptions and taking Year 1974 as our base year, we arrive at the following population projection figures (Table 14 column 2 below).

TABLE 13

Bus Trip Table

from 1712 interviews of bus passengers

TO:	Bag.Road A 1	Kinondoni A 2	Morogo Road B	Uhuru Street C	Pugo R. D	Kilwa E	Kariakoo 9	Town Centre 3	Number of interviews
::									
or A 1	1	7	0	9	9	1	31	48	106
or A 2	3	15	2	13	12	3	44	80	172
or B	7	66	66	36	44	12	114	249	594
or C	3	3	13	14	1	3	83	114	234
or D	8	8	52	45	54	3	112	177	459
or E	4	0	3	11	0	18	43	68	147
l	26	99	136	128	120	40	427	736	1712

gressed rip table

TO:	A-B	C-E	9	3	Total
FROM:					
A 1	8	19	31	48	106
A 2	20	28	44	80	172
B	139	92	114	249	594
A-B	167	139	189	377	872
C	19	18	83	114	234
D	68	102	112	177	459
E	7	29	43	68	147
C-E	94	149	238	359	840
A-E	261	288	427	736	1712

See ~~Figure 3.2~~ MAP 3 for definition of boundaries.

A 2 = Zone 11

A 1 = Sector A - Zone 11

Past statistics have also indicated that 35% of the total population are bus users.[5] From this it can be expected that in 1974 about 175,000 people were bus users and for the following years see Table 14 column 3 below.

In addition, past data has indicated that 45 trips per month are performed by every bus user.[6] Hence in 1974 there were supposed to be 95 million passenger trips (i.e. 45x12x175,000) or a daily average of 304,000. Nevertheless, only 80,812,398 trips were actually taken in that year for one reason or another.

From the information given above, an estimate is made on the number of bus users, yearly passenger trips and daily average traffic as shown in Table 14 below:-

TABLE 14

Year	Estimated population (000)	Expected no. of bus users	Expected No. of Passenger trips (1,000,000)	Daily No. of Passenger trips (000)
1975	540	189,000	102	326
1976	572	200,300	108	345
1977	606	212,400	114	364
1978	643	225,100	122	390
1979	681	238,600	129	412
1980	722	252,900	137	438
1981	766	268,100	145	463
1982	812	284,100	153	489
1983	861	301,200	163	521
1984	912	319,300	172	550
1985	967	388,500	183	584

With the estimated number of passengers for the years 1975 - 1985 above, the required number of buses on road per day can be calculated. If we assume that the average number of passengers carried per bus at any time is 80 i.e. average for peak and normal hourly period, the following number of on the road buses must be provided to satisfy the demand for public transport expressed in the increasing number of potential passenger trips:-

TABLE 15

Year	Daily No. of passenger trips ('000)	Hourly No.of Passenger trips *	Number of passengers per bus	No. of buses needed on road per day
1975	326	19,176	80	239
1976	345	20,294	80	254
1977	364	21,411	80	268
1978	390	22,941	80	287
1979	412	24,235	80	303
1980	438	25,764	80	322
1981	463	27,235	80	340
1982	489	28,764	80	359
1983	521	30,647	80	383
1984	550	32,352	80	404
1985	584	34,352	80	429

Note:- (i) * Assuming that a working day is 17 hours i.e. 5.00 a.m. - 10.00 p.m.

(ii) The number of buses on road does not include mini-buses.

TABLE 15a: TOTAL PROJECTED BUS TRAFFIC GENERATION BY SELECTED RESIDENTIAL DISTRICTS YEAR 1980

Residential District	Estimated population	Expected No. of bus users	Expected No. of Passenger trips	Daily No of Passenger trips	Hourly No. of passenger trips	Minimum No. of buses needed per hour
Magomeni	78,100	27,335	14,760,900	40,330	2,372	30
Mansese	75,260	26,341	14,224,140	38,863	2,286	29
Bugufuni	65,320	22,862	12,345,400	33,730	1,984	25
Kariakoo	63,900	22,365	12,077,100	32,997	1,941	24
Temeke	63,900	22,365	12,077,100	32,997	1,941	24
Ilala	41,180	14,413	7,783,020	21,265	1,250	16
Kinondoni/Mananyamala	35,550	12,442	6,718,680	18,357	1,079	13
City Centre	21,300	7,455	4,025,700	10,999	647	8
Ukonga	17,040	5,964	3,220,560	8,799	517	6
Kawe	14,200	4,970	2,683,800	7,332	431	5
Msasani	14,200	4,970	2,683,800	7,332	431	5
Ubungo/University	7,100	2,485	1,341,900	3,666	215	3
Kijitonyama	4,260	1,491	805,140	2,199	129	2

Table 15a continued

Changombe	32,660	11,431	6,172,740	16,865	992	12
Kurasini/Mtoni	55,380	19,383	10,466,820	28,597	1,682	21
Kipawa	19,880	6,958	3,757,320	10,265	603	8
Upanga	18,460	6,461	3,488,940	9,532	560	7
Vingunguti	14,200	4,970	2,683,800	7,332	431	5
Oyster Bay	11,360	3,976	2,147,040	5,866	345	4
Kigamboni	8,520	2,982	1,610,280	4,399	258	33
Ubungo Industrial Area	12,780	4,473	2,415,420	6,599	388	5
Pugu Rd.Industrial Area	7,100	2,485	1,341,900	3,666	215	7
Regent Estate	4,260	1,491	805,140	2,199	129	2
Mikocheni	1,420	497	268,380	733	43	1
Sinza	1,420	497	268,380	733	43	1

Note:- The number of buses does not include mini buses

2.9 EXISTING ROAD CONDITIONS

The prevailing high degree of congestion is often attributed to the small proportion of urban space devoted to roads. Available data indicate that, whereas in the cities of developed countries roads typically occupy 15% to 20% of total urban area and over 30% in newer low density American cities, in the developing world the ratio often falls below 10% and ratios much above 15% are rare. In Dar-es-Salaam city, roads account for about 12% of total urban space.

2.9.1 CHARACTERISTICS OF EXISTING ROADS-CAUSES OF BUS DELAYS

The network of main roads fan out radially from Dar-es-Salaam to serve the immediate coastal area and to link with other economic centres in the country. Most of the roads are minor roads in the urban areas. With the exception of some remote rural areas, the Region is adequately covered by roads.

Generally the conditions of the roads in the Region are poor and the level of maintenance is low. The roads in the dry season are passable for most two wheel drive. The riding quality is rough even on paved roads in the urban area. In many urban areas inadequate road widths, shoulders, curbing and footpaths combined with poorly designed intersections, lighting and traffic signs contribute to haphasardous driving conditions.

The urban area of the Dar-es-Salaam Region has 402 km of roads, 258 km of which are bitumenised. Some of the street surfaces are breaking up as a result, potholes occur and cause damage to vehicles and in some instances accidents occurs because motorists swerve in an attempt to avoid damage and sidewipe on - coming vehicles. Major street preventive maintenance programmes have been curtailed in recent years.

Large scale road development has not taken place in the city for the last ten years or so. The only major road project at present is the construction of the shs 75 million/= dual carriageway from the city to Dar-es-Salaam international airport along the old Pugu road.

The wide variety of traffic sharing limited right - of way, and ranging at times from carts to the latest models of private cars is a serious factor in congestion. The greater the pressure on road space, the more speeds tend to be reduced to those of the slowest moving vehicles; the potential of faster public, commercial and private vehicles is wasted. Often, pedestrian and market activities intrude on the road space even of major arteries. Effective road capacity is generally further reduced by extensive uncontrolled parking of vehicles of all kinds and by ineffective signalling and other traffic controls. The existing road system in the older city meant for slow vehicles and pedestrians is not adequate to cope with needs of modern transport.

2:9:2 BUS TRAVEL TIME STUDY

The travel time is now viewed as a yardstick of highway service and an index of efficiency of roadway. It is an acknowledged fact that the reduced travel time constitutes one of the three primary benefits which accrue from road improvement programmes, the other two types of benefits being the reduction in the operating cost of motor vehicle and lower accident rates. Reduced travel time or the increased travel speed is a desirable thing when it is consistent with safety and economy of operation.

To this effect the author conducted a bus travel time study in the CBD for all bus routes in the area and on some selected routes, with these specific objectives:-

(a) to measure bus travel delays and hence degree of congestion particularly during peak hours.

(b) the measurement of spatial separation in terms of bus travel time between different zones of the city. Travel time is regarded as a better yardstick for the purpose of measuring the distance between various parts of the city, because the expression of distance in terms of physical units such as miles or kms. does not convey the full significance of spatial separation owing to the fact that the level of congestion is different on different sections of roads.

(c) The results obtained from (a) and (b) will enable us to find ways and means of promoting public transport.

2:9:2:1 STUDY FINDINGS

The findings of the study are that, areas of acute traffic congestion where buses pass are:-

- Uhuru Street, from Clock Tower to Msimbasi roundabout
- Morogoro Road from junction of Morogoro Road/Msimbasi street to Magomeni Mapipa roundabout.
- Bandari street, at level crossing between road and railway and between this crossing and Bandari street/Kilwa road junction.
- Crossroads of Kinondoni Road/Bagamoyo Road/Kenyatta Drive, Chang'ombe Road/Pugu Road, Morogoro Road/Morocco Road.

All the above areas are located in the CBD. Congestion is thus prevalent in the CBD area only. The following information is on peak hour flow, 7.00 a.m. - 8.00 a.m. (journey to work) and 2.30 pm - 5.30 pm (journey from work) as recorded by author on six different dates 2/8/75, 20/8/75, 1/9/75, 24/9/75, 21/12/75 and 2/1/76.

(a) Old Post office terminal to Kariakoo

Distance: 3.5 km.

Recorded bus travel times in minutes: 20, 13, 39, 21, 20.

Remarks:- (i) 3 narrow and uncontrolled roundabouts with a total of 12 approach roads (ii) one uncontrolled T-junction (ii) vehicles parked all along. On 24/9/75 the author made a parking survey. Total number of vehicles parked on both sides of the road from 9 - 11 a.m. was 51 motor cars, 6 buses, 7 motor cycles.

(b) Msimbazi street-from D.T. Dobie roundabout to Morogoro Road

Distance:2.75 km

Bus travel time in minutes 45, 18, 15, 30, 24.

Remarks:- (i) This whole section of road is used by about 95% of all down town and cross town traffic, cyclists, pedestrians, light and heavy commercial trucks to and from the port, warehouse/godown areas and Pugu Road and Ubungo industrial areas and up-country stations and Zambia.

(ii) There is level crossing between road and railway which delays road traffic when a train passes.

(iii) Uncontrolled and too many access roads (15) interfering with smooth flow of traffic.

(iv) A parking survey was carried by the author on 18/12/75 at 10.30 a.m. and the number of vehicles parked on both sides of the road are 73 cars, 16 buses, 28 trucks, and 4 motorcycles.

(v) One of the two main bus terminus is located here but with very inadequate facilities. Conflict between buses pulling out of bus-bys and vehicles on road is common giving rise to accidents. Msimbasi street ranks second after Morogoro Road in terms of UDA accidents in city.

(c) Old Post office terminal to junction of Kinondoni/ Bagamoyo Roads

Distance: 3.75 km

Bus travel times in minutes 20, 17, 33, 11, 15, 10.

Remarks:- (i) Four narrow and uncontrolled roundabouts with a total of 18 approach roads.

(ii) Selander Bridge - is narrow and has been recommended for either demolition and re-construction or expansion. It is the most congested point on the Bagamoyo Road.

(iii) The section between Selander Bridge and junction of Kinondoni/Bagamoyo Roads (about 80 metres) is the most congested part, sometimes it takes more than 15 minutes to go through this section. It is because of existence of points of conflict between left turning traffic to Kinondoni Road right turning traffic to Kenyatta Avenue and through traffic i.e. in coming and out of town traffic on Bagamoyo Road. There are no traffic lights here and this has compelled the Police to control traffic flow here in morning peak periods. Actually, it is the only spot in the city which is daily manually controlled by police.

(d) D.T. Dobie junction to Kilwa Road and Bandari street junctions

Distance:- 1.5 km

Bus travel times in minutes: 5, 28, 15, 17, 12, 20

Remarks:-(i) 2 small uncontrolled roundabouts with 7 approach roads.

(ii) Narrow bridge which crosses over the railway line is only 5 metres from one of the roundabouts. About 20 metres from the bridge there is a level crossing between road and railway. Traffic here is sometimes held for more than half an hour when

gates are closed to allow shunting by trains to the Oil depots. Undue haste in closing the gates by railway authorities and gate keepers leads to closing of the gates for longer duration which results in more delays and losses.

(iii) There is narrow bridge near Kilwa Road/Bandari Street junction where 2 heavy duty trucks or buses can't pass each other side by side. Most of commercial vehicles to the port pass through this bridge. And all UDA vehicles to and from Kurasini depot drive through this bridge.

TABLE 16:- BUS TRAVEL TIME ON SELECTED ROUTES

Service number	Line	Round trip route length in km	Actual recorded travelling time (hrs)
1A	Kinondoni - Old Post office	17.4	1.30
2B	Mwananyamalla B-Old Post office	28.4	1.45
3	Buguruni - Manzese	22.2	1.56
3B	Temeke - Muhimbili	18	2.00
4A	Congo la Mboto-Old Post office	36.4	2.30
4C	Ukonga - Old Post Office	32.4	2.22
5	Kawe - Old Post Office	25	2.00
6A	University - Old Post Office	28.1	2.00
7	Africana - Old Post Office	94	3.00
8B	University - Kariakoo	28.2	1.50
9	Mbezi - Kariakoo	42	2.30
9C	Kibaha - Kariakoo	108	4.00
10	Kigogo - Manzese	23.8	2.00
11	Kigogo - Old Post Office	13.2	1.20
12	Buguruni - Ferry	14.8	1.30
13	Kimamba - Old Post office	17.4	1.50
14	Kajera - Old Post Office	17.4	2.00
15A	Magomeni Kondoa - Ferry	14.2	2.00
16	Temeke - University	42.6	2.45

Table 16 continued

16			
19	Tandika - Muhimbili hospital	20.9	1.20
20	Temeke - Old Post Office	17.4	1.30
20A	Temeke - Kariakoo	12	1.05
29	Kongowe - Kinondoni	49	3.00
30	Kiparang'anda - Muhimbili Hosp.	108.6	4.45
32	Mapipa - Mikoroshini	17.4	1.30
33A	Vingunguti - Ferry	21.2	1.57
34	Kurasini - Kinondoni B	33.2	2.00
36	Buguruni- Kariakoo	11	.45

From the above analysis we can see that the causes of bus delays (traffic jams) are, briefly, inadequate or lack of traffic control devices, haphazard parking along main roads, lack of bus lay bys, absence of good link or short-cut roads linking main roads, increasing number of vehicles on the same road space and paucity of resources (shortage of technically trained manpower such as engineers, technicians and skilled manpower, shortage of road operating and maintenance equipment, and the rising cost of road construction and maintenance) etc.

2:9:3 EFFECTS OF CONGESTION ON COSTS OF BUS OPERATION

The afore mentioned facts obviously affect the movement of buses as well, in causing delays and deviations from the time schedules. With greater congestion, higher operating costs of road vehicles are to be expected as well as increased losses of personal time, discomfort and pollution.

The vulnerability of buses to congestion is in part due to the composition of their costs. More than three-quarters of the total costs per bus mile - now typically somewhat over cents -/50 - are accounted for by operating

costs in which labour costs for driving, ticket collection, maintenance and administration, form the main part. The delays of congestion cause both labour and fuel costs to rise sharply. Moreover, congestion is particularly severe on the main bus routes where most bus passengers are to be found.

Congestion delays to buses are in any case, greater than for automobiles, to the increased difficulties of pulling into and out of bus stops is added "bunching" of buses which greatly increases average time at stops. Capital costs also rise since with lower speeds and "bunching" more buses are required to move the peak hour passenger volume. Costs per passenger mile, now typically a little over cents -10, may however rise proportionately less than costs per bus mile. During peak periods, the greater number of passengers carried per bus may offset the lower number of bus trips. Passengers suffer from congestion primarily through longer times spent in waiting, boarding and travelling and considerably greater discomfort. The point to be emphasised here is that traffic congestion not only tends to reduce the efficiency of economic activities but also creates a heavy backlog of capital investments for public transport (and other forms of transport) and other overheads.

2:9:4 THE SAFETY STANDARD OF THE EXISTING BUS STREET NETWORK

A systematic study of road accidents is required to measure the safety standard of the existing street network and to pinpoint black spots which may require early treatment. Accordingly, the author made a study of accidents in Dar-es-Salaam for 1970, 1972 and 1974, between only UDA buses and Third Parties (other vehicles, pedestrians, cyclists, other objects etc). It was impossible for the author to cover the same kind of thorough study for all city accidents due to time limit. Secondly, by concentrating only on accidents involving UDA buses and Third Parties it is possible to find out the best strategy UDA Management can employ to reduce accidents and hence operating costs.

Table 17 reveals concentrations of accidents on certain roads which should be examined in greater detail to suggest possible remedial measures to be undertaken by the city authorities and UDA management since it will be seen below that accidents can seldom be attributable to the road layout alone but also a variety of minor factors play an important part. Table 17 also summarizes the important characteristics of UDA accidents, showing the location by major radial bus routes and other important feeder routes for the months of January - December 1974. The characteristics are representative for all months and years with the exception that there is an increase in number of accidents, from one year to another due to an increase in fleet size and vehicle numbers on roads and related factors.

TABLE 17:- DISTRIBUTION OF UDA ACCIDENTS ON DAR-ES-SALAAM ROADS, 1974

Site	Number of Accidents	Percentage of Total
Morogoro Road	90	17.3
UDA Depot, bus station and Old Post Office terminuses	69	13.2
Msimbazi Street	58	11.2
Uhuru Street	54	10.3
Bandarini Street	36	6.9
Pugu Road	35	6.7
Bagamoyo Road	24	4.6
Kilwa Road	23	4.4
City Drive	21	4
Morocco Road	15	2.8
Kigogo Road	15	2.8
Others	80	15.3
TOTAL	520	100.0

Source:- UDA, Traffic Department

Most of the accidents take place at junctions where above main roads and adjoining feeder roads meet, most of these are uncontrolled junctions where there are no traffic signals. The nature of these accidents are narrated below.

If one correlates data on Table 17 with traffic conditions and particularly vehicular flow on the busiest and heavily congested roads - Morogoro Road, Pugu Road, and Bagamoyo Road - one can see that the most congested road - Morogoro Road - with 1,080 vehicles per hour, records the highest number of UDA accidents in the city with 90 accidents in 1974 accounting for 18% of all UDA accidents in that year. Next in importance is Msimbazi Street which accommodates all through traffic to city centre from all corners of town. One interesting but shocking information from Table 17 is on the number of accidents taking place at UDA depot yard and the Bus Station and Old Post Office terminus. These are caused by reckless mechanics and drivers who in the course of executing their duties knock at fixed or movable objects and or persons.

TABLE 18: NATURE OF UDA ACCIDENTS, 1974

Type of Accident	Number	Percentage of Total
Pedestrian involved	11	2.1
Vehicle Skidded	7	1.3
Pedal or motor cyclist involved	13	2.5
Vehicle/Vehicle collision (head on)	44	8.4
Vehicle collision with Stationary Vehicle or other object	400	76.9
Passenger boarding or alighting a bus	29	5.5
Others	16	3
TOTAL	520	100.0

TABLE 19: WHOSE FAULT

	Number of Accidents	Percentage of Total	
Third Party	270	51.9	
UDA driver	135	25	49.1
UDA driver/mechanic vs UDA driver/mechanic	115	22.1	
TOTAL	520	100.0	

TABLE 20: YEARS OF SERVICE OF DRIVER WITH UDA COMPANY

Period in UDA Service	Number of Accidents	Percentage of Total
Up to one year	233	49.1
One year and above	241	50.9
TOTAL	474	100.0

Note: 46 accidents have not been recorded here because information on numbers of years in service of UDA by drivers who caused these accidents was not available in the accident register.

The author has tried to group all the above accidents into classes/categories according to their detailed nature. Below is a brief summary of the classes:-

- Overtaking a stationary parked vehicle (in the bus lay by) or a vehicle in motion without due care causing damage to vehicle (10% or 52 accidents)
- Vehicle rolling back, colliding into a hind vehicle due to failure of driver to start the engine and set off safely ahead of another vehicle (26 accidents or 5%)

- Failure to stop at major road ahead (42 accidents or 8%)
- Failure to negotiate a turn properly either to the left or right on entering a major or minor road thus colliding head on with vehicle driving from opposite direction (62 accidents or 12%).
- Failure to stop a vehicle safely behind another vehicle (i) stopped at zebra crossing to allow pedestrians to pass (ii) stopped at the traffic lights. (78 accidents or 15%).
- Reversing vehicle without proper guidance (10 accidents or 2%).
- Failure to engage proper gear e.g. instead of engaging gear No. 1 driver wrongly engages the reverse gear thus his vehicle rolling back colliding into another vehicle (5 accidents or 1%).
- Due to excessive speeding, mechanical defect or driving without due care vehicle hits at a stationary or mobile object e.g. bus shelter, electric pole, tree, house, gate, hand cart, cyclist, pedestrian, ditch, trench, steel fence, pedestrian guard rails etc. (208 accidents or 40%).
- Failure to stop on approaching a roundabout to give way to a vehicle weaving in the roundabout because of miscalculation of speed and distance (21 accidents or 4 %).
- Failure to secure properly vehicle handbrake and causing vehicle to roll ahead (16 accidents or 3%).

The most common damages to vehicles are parking lights, front indicators, rear view mirrors, drivers door glass, headlamp glass, middle body, front body, rear body, front indicator lens, windscreen etc.

In looking at the causes of these accidents it can be seen that they occur due to either human failings, the character or conditions of the roads, the condition of the vehicles, or a combination of these reasons. It is seldom possible to assign

a single contributing factor to a given accident. The author's analysis of above data indicate that about 60% of all accidents are caused by highway defects. Cases of UDA bus mechanical defects are rare compared to cases of reckless driving by UDA drivers. Most of the accidents taking place at the depot yard are caused by mechanics without driving licences.

2:9:5 EFFECTS OF ACCIDENTS ON COSTS OF BUS OPERATION AND MAINTENANCE

Increase in number of accidents gives rise to high vehicle operating costs, high rate of vehicle depreciation, high insurance premiums and high vehicle maintenance costs.

TABLE 21:- ACCIDENT COSTS

Year	Labour charges Shs	Material Costs (Shs)
1972	83,040	272,309
1973	93,057	232,845

Note:- There is a drop in material cost from Shs:272,309/- in 1972 to Shs:232,845/- in 1974 because costs for 1972 included both for City and Up-country buses while for 1974 included City services only with the exception of months of January - April.

Footnotes:-

3. See "Bus Transport for Site and Service Areas, Dar-es-Salaam, Cowiconsult (Consulting Engineers and Planners), July 1973 page 16.

4. Ibid.

5. National Transport Corporation Paper on Causes of Traffic Jams in Dar-es-Salaam (un-published paper) 1974.

6. Ibid.

CHAPTER 3

IMPROPER UTILISATION OF MANPOWER AND CAPITAL RESOURCES AS A CAUSE OF PUBLIC TRANSPORT DEFICIENCIES

3.0 INTRODUCTION

Operational efficiency of passenger transport service is synonymous with the productivity of the system. Basically, the operational efficiency depends on the utilisation of men and machine through the medium of which transport service is rendered to the travelling public. It is no use continuously supplementing the fleet and staff strength without making effective use of existing equipments and personnel, for unsatisfactory utilisation of both of these factors tends to increase the cost of operation to the detriment of the undertaking, travelling public and the economy as a whole. Similarly the over aged and outmoded fleet, poor maintenance etc are regarded as serious problems to every transport agency. Such a fleet together with too many makes and types of buses results in costly maintenance. This also affects the operating ratio which is the ratio between the average number of vehicles in daily service and the total number of vehicles held in the fleet and which in turn is an indication of the state of serviceability and efficiency of maintenance.

The aim of this Chapter is to explore the basic factors which give rise to the inefficiency of public transport system in Dar-es-Salaam. We have already seen in Chapter 2 how the inadequate road conditions in the city affect scheduling, departure and arrival time, and congestion with its economic and social costs. This is a physical problem beyond the control of UDA and hence the Company has to operate within these physical parameters. On the other side of the coin, some of the problems of city bus transport are operational and management in nature and the blame lies with the entire UDA personnel. This is implicit if we probe into the

day-to-day functioning of the company and the main functional characteristics. By so doing we can identify problem areas.

In undertaking this exercise, the author has applied five yardstick for measuring the degree of efficiency and effectiveness of UDA personnel and vehicles and these are:- Management techniques applied, operational techniques employed, workmanship in workshop, commitment by bus crew, and a look at the Recurrent and Capital Expenditures of UDA.

3:1 MANAGEMENT TECHNIQUES

Transport management techniques can be proper and adequate only when you have the right people at different levels of the organisational hierarchy to make the right decisions at the right time. Insufficient trained manpower both quantitatively and qualitatively is the main problem giving headache to UDA management and the Government as a whole. There are two basic factors accounting for this problem one is historical and the other is managerial.

3:1:1 PROBLEMS AFTER NATIONALISATION

Lessons from developing countries, indicate that nationalisation of industries brings some inherent problems, so was the case with nationalisation of UDA on 1st April, 1970. When it happened, most of the highly qualified and skilled staff (mainly expatriates) decided to discontinue their services with UDA and instead were absorbed into other subsidiary companies of United Transport Overseas Ltd, (U.T.O.) operating in more than 100 countries of developing world formerly under British colonial rule.

The U.T.O. was not as committed to develop public transport industry in Tanzania as it was in Kenya. For example, no effort was made towards establishing an Institute of Transport in Tanzania to train manpower at either certificate, diploma or undergraduate level for the various departments of UDA.

Instead, UTO opened one such School in Nairobi which accomodated students from East Africa. Few Tanzanians were offered places at this institute, otherwise most of them gained on-the job training.

Little effort was made by UTO to expand the inadequate workshop facilities available at the time. Prior to nationalisation some of the major jobs of maintenance were carried out at the UTO central workshops in Nairobi where large stocks of spare parts were maintained. No large stocking of spares had been permitted to exist at Dar-es-Salaam by the UTO. From the operational side the fleet was not enough to meet the public demand.

Fear of uncertainty of business in Tanzania was high among UTO management, especially with the promulgation of the Arusha Declaration of 1967 which among other things, called for the nationalisation of the commanding heights of the economy including transport industry. This fear was further raised high with the creation of the National Transport Corporation in 1969 with the aim of acquiring, by agreement, and hold interest in any transport business and to manage it. The struggle by the now defunct Dar-es-Salaam City Council to secure a reasonable share of local participation in the business of UDA lasted for some years until in 1965 when the Council acquired 25% shareholdings in the Company.

In short, UTO was less concerned with investing in Tanzania due to the turn of political events there. At same time, UTO consolidated its stronghold and investments in Kenya at the expense of Tanzania. PROBLEMS OF UDA CAN BE EXPLAINED ONLY BY THIS HISTORICAL PRECEDENT.

3:1:2 IMBALANCE BETWEEN EXPANSION OF WORKSHOP BUS FLEET AND ROUTE NETWORK ON ONE HAND, AND RECRUITMENT AND TRAINING PROGRAMMES ON THE OTHER HAND

New UDA management became ambitious immediately after nationalization by expanding workshop and bus fleet and extending route network without paying due consideration to recruiting and training people to carry out this ambitious project. For instance, a Shs.1.9 million/= workshop extension and the hard surfacing of 2½ acres of land was started immediately after nationalisation in April 1970, at Kurasini depot to accommodate 200 vehicles. The entire project was completed just after one year in May, 1971 to provide a further workshop space for 120 buses. Provision was also made in the new expansion for larger and adequate spare parts. In 1972, about 100 new Bens buses were purchased in one lot. These buses have brought very severe operational problems to UDA to the extent that in 1974 the Company had planned to auction almost the whole Bens fleet. For almost the whole of last year 34 new Ikarus buses which were imported early in the year remained idle without being utilised due to inadequate depot facilities.

The expansion programmes were not seriously accompanied by training and recruitment of highly qualified staff at various levels to man the four Departments. For example, in April 1970, when UDA was nationalised, there was no qualified citizen engineer at this time to manage the buses in the workshop. The posts of Chief Engineer, Traffic Manager and Personnel Manager remained vacant in 1974, and 1975 respectively when they were filled. The first two General Managers had neither formal nor informal education, training and experience in transport management. There were no engineers in the Company until late in 1973 when 4 expatriate engineers arrived.

To-date the following number of senior posts are still vacant:- Depot Manager (Ubungo depot), Executive Officer (Ubungo), Personnel Officers (3) Personnel Assistant, Chief Internal Auditor, Senior Accountants (2), Accountants (5), Internal Auditor, Accountant trainees (2), Assistant Internal Auditors (2), Chief Engineer (the present one is on secondment from Ministry of Communications), Divisional Engineer (Ubungo), Senior Engineers (2), Assistant Engineers (2), Stores Officers (2) and Store Keeper. In the Engineering Department, one expatriate Senior Engineer, three expatriate engineers, and one expatriate Chief Store Keeper will have to be replaced by citizens.[7]

3:1:3 ON THE JOB FRUSTRATION

Frustrations in the course of executing one's duties can be expressed in so many ways. For example, the absence of scheme of service (training and advancement), overtime payment, incentive wage (bonus system) etc. can contribute to low productivity in an organisation. UDA is not an exception to this rule. Up to now there has been no attempt to draw up a scheme of service for UDA personnel at various levels. This scheme is supposed to show the criteria or conditions under which an employee can be promoted or demoted from one grade or level to another. In the absence of this, promotion can be based on factors other than merit. It is no secret that UDA had instituted no system of annual confidential reports for its employees to assess individual job performance, until late, last year. An appraisal of each officers qualifications, ability and work performance is essential in the interest of the officers themselves and for the efficiency of the services as a whole. Such reports are supposed to cover employees knowledge of the job, quality of work, productivity, ability to learn, initiative conduct/co-operation, and punctuality. There were even no probationary reports until late last year on UDA staff. The aim of this report is to determine whether the trainee or the

newly recruited employee is suitable for confirmation and subsequent further training.

A number of young men who were trained in formal institutions or on the job in various aspects of transport management and who commanded good skills and abilities in their work left UDA to look for jobs in other transport companies with better working conditions and prospects. This was mainly attributed to the absence of scheme of service whereby they were working in an atmosphere of uncertainty as to one's chances of promotion and further training.

There has also been too much emphasis on paper qualification rather than ability of person to do his work deligently. This has been the case especially in the Engineering Department whereby most of the skilled mechanics and technicians were those without high formal education but promotion was based and awarded to workers with (diploma) certificates but with less skills and experience. This frustrated the well experienced workers who had served in the Company for a very long period and as such productivity in the workshop was threatened and some of them decided to look for jobs elsewhere where frustration of this nature is minimal if not non existent.

Workers have been given a forum whereby they can express their opinion and present their cases and frustrations to the Workers' Committee and Worker's Conciliation Board. But efforts have not been made by the management to make sure meetings between workers and management are held to iron out differences of opinion on proper management and operation of the Company.

3:1:4 NEED FOR INNOVATIVE AND ADAPTIVE ATTITUDE

Conservatism is a very strong force working against an inquisitive and reformative sort of attitude. One can

learn whether what he is doing is wrong or right only when he compares the actions and experiences of others. To this effect it is essential for top UDA management to visit other well organised public transport companies probably in cities of same magnitude and physical characteristics like Dar-es-Salaam.

It is only through such visits can an innovative and adaptive attitude be instituted in the Company.

UDA management has visited a number of countries including Kenya, Uganda, Zambia, Holland, Hungary, West Germany, Yugoslavia and Belgium on study tours. But these tours are short-lived covering only a few days in each host country.

An ideal type of study tour is one which covers for example 6 months, during which UDA personnel could directly work in foreign bus company and participate in the day to day functioning of the company. When this is accomplished there is no doubt that one will understand the secrets to success in public transport planning in terms of the best management and operational tools and techniques to employ. To some extent, UDA is cut off from the flow of information of new developments and improvements in the field of public transport because there are hardly any contacts with other progressive transport companies.

3:2 OPERATIONAL TECHNIQUES

By operational techniques we normally refer to the way the buses and crew is organised and operated to meet riders' requirements. Here we are particularly interested in the day-to-day working of the Traffic Department and related operational problems. These problems can be looked at from four different angles namely:-

3:2:1 INADEQUATE RESEARCH AND PLANNING ACTIVITIES

Insufficient recruitment both quantitatively and qualitatively retards attempts by UDA to make research and planning activities more meaningful and utilise research results in practice. The object of transportation research is primarily to provide UDA an improved transportation operations, on the basis of which the company can take decisions. In order to take decisions that will lead to the best solution of a problem it is necessary for UDA to understand the underlying principles as thoroughly as possible. Furthermore, facts and figures must be available so that the consequences involved can be evaluated from known quantities and relationships.

Strictly speaking there has been no research activities in UDA, and particularly in the Traffic Department where a section dealing with research and planning is supposed to be located. The Department is collecting alot of data on traffic e.g. bus delays, crew punctuality reports, lost mileage due to involuntary stops, scheduling and rescheduling of buses, breakdowns, vehicle maintenance and servicing and despatching etc., but absolutely no analysis of this data is made to see its implications to the Company in terms of the existing level of service, problem areas and (best) strategies to undertake to overcome deficiencies. Data collected by drivers, conductors, mechanics, despatchers, engineers, Mileage section, the Inspectorate and Traffic Department in general is only kept in files as a daily routine activity and end up being stored in shelves.

The main weakness arising from this habit is the prevalence of routine type of work in each Department. It is very difficult to promote forward planning since this is possible only by reviewing past experience and from this forecast conditions. This calls for the establishment of a full-fledged Research and Planning Section to promote research and planning activities in the company.

The distribution of buses by routes at different times of the day is a case in point. This distribution is not based on both the actual and latent demand of the different land use zones in the city, but on the actual passenger congestion on a given route. But passenger load differs from one day to another and from one time of the day to another. Worse still no attempt has been made to identify and determine the magnitude of latent demand, so that even passenger demand projections is based upon projections of travel actually performed.

We normally tend to forget that there is also a large element oflatent travel demand - the trips that would be taken if adequate public transport service were available. Since private automobile ownership is not high in Dar-es-Salaam, the principal source of latent demand are those individuals who have no access to the automobile. If one of the goals of public transportation planning is to provide equal access to urban opportunities to a maximum number of people, then latent demand can't be ignored. In planning approach UDA must take full account of transport needs unmet by existing public transport system.

Constant re-scheduling of buses is another case in point. This activity is carried out mainly at the very busy points - Kariakoo and Old Post Office terminus. The distressing part of the matter is that the re-scheduling is done based on the state of affairs (passenger load) at these two terminals at a particular time but not on the basis of passenger load on the whole route (e.g. Kariakoo - Ubungo) that the particular bus taken away was supposed to serve. There might be a lot of people waiting between Kariakoo and Ubungo but as the decision to reschedule the bus is based on the situation at Kariakoo, these people are not taken into consideration.

A related problem arising from inadequate research is that, because of improper scheduling many morning shifts end up at or before 9.00 a.m. when it is still the peak period in Dar-es-Salaam.

The problem is that although more priority in distribution of buses and shifts is given to those schedules with continuous shifts, still some shifts out in the mornings are those broken in nature. The remedy is to despatch those services with continuous, uninterrupted shifts first before the broken shifts.

3:2:2 PROPER SPACING OF BUS TIMINGS AND SERVICES

Reliability of bus services implies punctuality and regularity which in effect ensures not only timely departure from, as well as arrival at, terminals of bus services, but also passing through intermediate stops at right time. Being dependent on many factors such as the practice of strictly adhering to time schedule, satisfactory condition of buses, the absence of abnormal delays enroute etc, the reliability of service naturally is affected by the upset of any of these factors.

Judged by the results obtained from the observations made by the author at certain places in particular periods it could be inferred that services in outer routes were generally more successful in keeping track of time schedule. However, in the CBD area the bus services were either not always able to cope up with schedule or the scheduling of services along common routes is not properly spaced, as a result of which it is uncommon to see more than one bus plying in quick succession in one and the same direction and route at particular time intervals. Such instances of bunching of trips at particular routes, hours and places lead to denial of timely passenger service to travelling public, besides resulting in longer waiting time, lesser utilisation of bus fleet and lower revenue receipts. Therefore the need for proper spacing of bus timings and service can hardly be over emphasised.

During the time of changing the staff especially between 12 noon and 1.30 p.m. there is slack in operation of UDA services owing to the prevailing tendency of outgoing staff to close the shift much earlier and of in-coming staff to join the duty rather leisurely. It was noticed by the author that the early morning services before 6.30 a.m. are mostly negligible in a good number of routes and this feature of late resumption of services is not keeping with the magnitude and type of activities in a city like Dar-es-Salaam, which, as a matter of fact, should be provided with pre-dawn services to meet the demands and convenience of intercity passengers.

The same problem is repeated with night services. Not enough buses are allocated for night duties in relationship to passenger demand and even the mini-buses which are supposed to decrease passenger load on congested roads particularly the heaviest load at the CBD (Kariakoo) have their services terminated at 8.30 p.m. For the big buses most of the night trips end up before 9.30 p.m. and a few of them that go beyond this time are not wholly fulfilled because of very poor supervision of crew by the Inspectorate Section at night.

3:2:3 CREW ASSIGNMENT AND ALLOCATION OF INSPECTORS

A rota showing where drivers and conductors are supposed to report for duty either at depot, Kariakoo or Old Post office terminus, for the whole week is usually prepared on Sundays. The rota indicates the Running Number of bus, shift number, reporting time, and driver's and conductor's number etc. Each member of crew is given one day off duty in a week. The rota shows the routes the crew will have to operate. Nevertheless, what is actually planned for is not easy to implement. The rota is sometimes not followed due to a number of reasons such as breakdowns, unavailability of buses, failure of some crew members to report for duty, insufficient number of ticket machines etc. All these factors call for changes in shifts, and

in many cases the changes are erratic and disorganised. We shall analyse more of this in sections to follow.

Bus despatching process and consequently the delivery of buses for operation also takes unwarrantedly long time because of the bus congestion at the workshop. As the despatching process extends into the morning peak period it interferes with the smooth flow of passengers at this critical time. This explains why the would-be passengers are frequently stranded at bus stops and terminals in the mornings.

The control of traffic flow on the routes falls under the Inspectorate Section headed by the Chief Inspector. He is assisted by a team of Inspectors and ticket examiners of varying grades whose duty is to ensure that the conductors and drivers do adhere to the timetables as much as possible. By making regular surprise checks inspectors are supposed to control the flow of traffic in the zones assigned to them and that way eliminate the loss of trips. They have also to ensure that the drivers keep a high standard of care to facilitate road safety for both the bus and passenger and other road users.

One of the main problems with the Inspectorate Section is that the number of inspectors allocated for night duty is not enough to ensure that crew members comply to the time and duty schedules. This gives drivers and conductors freedom to decide either to undertake the trips or not or to change route schedules at their own discretion. This is a common practice especially after 9.00 p.m. when only 2 inspectors are assigned to control bus traffic for the entire city. See Appendix D. There is therefore need to strengthen manpower position in the Inspectorate Section. Inspectors should be posted at two terminus at night to record in-coming and out-going buses and counter check this information with duty and time schedules and report any discrepancy for a disciplinary action to be taken against offending crew.

3:2:4 SYSTEM OF ISSUING TICKETS AND MONEY TRANSACTIONS

UDA used to charge a graduated fare system whereby fares were charged according to the distances (stages) travelled, so that the fares increased in proportion to distance travelled. The company introduced on 1st September 1974, semi-flat rate fare system ranging from cents =/50 (lowest) to Shs.1/-, 1/50 in the city while those travelling to the outskirts of the city, mainly in the Coast Region pay Shs:2/= and above, with cents =/50 as the difference. Furthermore, UDA introduced two types of seasonal tickets, one costing Shs:80/= which entitle the holder to travel in the company's buses to any destination for one month and another costing Shs:60/= valid for only a specific route for one month.

The author has travelled on a number of routes recording travel time between origin and destination points. This has been covered in Chapter 2. He observed that in most bus stops, buses stand between 3-4 minutes and more to allow the conductor to issue tickets to embarking passengers and to give "change" to alighting passengers. What is required is to look for a better system of issuing tickets which will not result in restricting the productivity of bus fleet and running staff and causing delay and frustration to travelling public. The Company should at least set up ticket kiosks at major points of passenger congestion to enable passengers obtain tickets before boarding buses and thereby avoid unnecessary delays caused by the present system. Such Kiosks should be erected at the Old Post Office and Kariakoo main terminus, Mansese, Kigoge, Temeke, Tandika, Buguruni, Kinondoni, Mwananyamala, Ukonga, Mtoni, Mbagala and Magomeni Kagera, Mapipa Kondoa and Mikumi terminals.

3:2:5 COORDINATION BETWEEN TRAFFIC AND ENGINEERING DEPARTMENT

This is a problem related to the checking and reporting of

technical failures and damages caused during the movement of buses. The author has studied the way accidents and breakdowns are reported to the workshop and Despatch Section of Traffic department. The findings are interesting. Broken buses are abandoned for a period ranging from one hour to twelve hours a few of buses with their engines on. This proves that there is some shortfall in the information transmission and the speed of reaction of the Engineering Department.

The co-ordination between the Traffic and Engineering Departments appears to be inadequate in this matter and it is not clear which officer takes responsibility for delays in repairing or servicing the broken bus. Furthermore it takes a lot of time to provide bus replacement in case of a breakdown on route. A relief bus may not be available at the time it is needed sometimes due to inability of workshop to provide one. The number of patrol cars and mobile recovery vans should be increased to keep a continuous and effective check on flow of buses.

3:2:6 HIGH DEGREE OF DRIVER-VEHICLE SPECIALISATION

The relatively high number of bus models run by the Company (Fiat, Benz, Leyland, Isuzu and Ikarus) aggravates the problem of poor workmanship in workshop in terms of maintenance and servicing. Worse still an interesting method has been devised by UDA management whereby each driver is assigned to drive only one group of the following vehicles (i) Ikarus 280 (ii) Ikarus 266 (iii) Isuzu minibuses (iv) new Fiat, Leyland and Benz buses (v) old Fiat, Benz and Leyland buses.

This specialisation has so many operational disadvantages which outweighs the advantages. From field observation, it is not uncommon to find buses parked at the two terminus and bus

station for hours just because the right type of drivers to drive those vehicle makes are not around. At same time drivers assigned to drive other vehicle types may be around, sitting idle, just because of non-availability of the buses they have been allocated to drive. The management should review this policy seriously and relax a bit. For example, all drivers who crew Ikarus buses were the most competent drivers of Leyland, Fiat and Bens buses in UDA before being given special training on Ikarus vehicles. There is no reason why they should be confined to Ikarus buses only while they have the knowledge, expertise and experience with Leyland, Fiat and Bens vehicles.

There are, on the average, more than 15 such cases a day when Road Safety Inspectors and drivers on light duties are compelled to drive stranded empty buses to the two depots.

3:3 DEGREE OF COMMITMENT OF UDA BUS CREW

Drivers and conductors are the most productive workers in any public transport undertaking. This is because their productivity can be measured in physical and monetary terms. Physical productivity includes the distance and time covered by crew per shift. Fiscal productivity is measured by the number of passengers carried and resulting revenue (fare collected). It is very difficult, for example, to measure the productivity of workers in Personnel, Accounts and Engineering Departments because their output cannot be easily expressed in purely economic terms.

An analysis of passenger fare collection per day and month has been made in Chapter 2 and its characteristics narrated. One question which we ought to have asked ourselves much earlier is if there is any possibility of increasing daily revenue collection or in other words if the current amount is in accordance with what is expected. Henceforth, we are mainly concerned with the level of productivity of conductors and

drivers if it is high or low. The answer is the later.

This can be measured by looking at the punctuality report which shows the number of drivers and conductors per day with cases of late comings, sickness, excused duty, absenteeism etc.

Information below, Table 22 is computed from daily number of different categories of cases as shown.

3:3:1 PUNCTUALITY AND ABSENTEEISM BY DRIVERS AND CONDUCTORS

TABLE 22:- UDA, MORNING POSITION, CITY SERVICES
JANUARY - JULY 1975

Month	N U M B E R				
	Late Comings	Sick	Excused Duty	Absent	Overtime
January	322	393	78	670	1075
February	197	372	88	655	740
March	376	348	96	1042	660
April	210	346	64	1016	260
May	401	513	129	1842	5
June	336	414	61	1275	1
July	313	350	52	1124	275

Note:- Data for 20/4/75, 21/4/75, 27/5/75, and 28/7/75 is not included here.

A summary of the data above shows that on the average, more than ten drivers and or conductors report late for duty

in the mornings, and of those who turn up, about 15 of them are sick every day. These are assigned light duties. Data on the number of drivers and or conductors who absent themselves from duty in the mornings is very shocking. For the months of January-July, there are always more than 37 drivers and or conductors per day who do not turn up for morning duty with no proper reason. This is very common especially on or after paydays. This is a very grave situation which affects transportation of workers in the city. To explain the magnitude of the problem the author has extracted the following detailed data from Table 22.

TABLE 23:- UDA, APRIL AND MAY 1975: MORNING POSITION

Date	No.of Conductors absent for duty	As a Percentage of Total Conductors for Morning Shift	No.of Drivers absent for duty	As a Percentage of Total Drivers for Morning-Shift
27/4/75	38	24	56	35
29/4/75	14	9	52	33
30/4/75	21	13	38	24
2/5/75	20	13	50	31
3/5/75	29	18	55	34
4/5/75	25	16	63	39
6/5/75	32	20	44	28
7/5/75	34	21	37	23
8/5/75	23	14	58	36
9/5/75	28	18	46	29
10/5/75	18	11	39	24
11/5/75	33	21	43	27
12/5/75	45	28	27	17
14/5/75	38	24	49	31
22/5/75	34	21	36	23
30/5/75	37	23	38	24

Note:- 160 big buses are supposed to be deployed every morning. This means that the minimum number of drivers and conductors required is each 160. This information is obtained from UDA's vehicle running cards.

Consider a case where for example, 63 drivers failed to report for duty on the morning of 4/5/75. This means that the number of buses actually deployed in that morning was minus 63 of the planned number. Furthermore, it means that 63 buses which carry about 8,000 passengers at one time were lying idle in the depot leaving at any one time 8,000 would-be passengers stranded on the roads. Consequently, the available buses on the roads are overcrowded, duty and trip schedules are interrupted and become disorganized, such factors as riding comfort, convenience, accessibility to urban opportunities, frequency and reliability are impaired.

Their failure to report for duty has negative financial implications to the company as it leads to an increase in operating costs. At same time it leads to an increase in overtime payments since the management has no alternative but to employ off duty drivers and or conductors who incidentally report to depot in the mornings for over time work. See Table 22 column 6.

As a corollary to above information on daily morning position, the author has tried to relate this with the position for the whole working day, for the months of January, February and August, 1975. Table 23a, 23b, 23c are self explanatory.

[redacted] SHIFTS OUT PER DAY FOR THE MONTH OF JANUARY 1975

Date	Number of ticket Machines Short	AS A PERCENTAGE OF 151 SHIFTS				
		Shifts on time	Shifts out 20-40 minutes late	Shifts out over 40 minutes late	Total Shifts out	Short of shift
	January	January	January	January	January	January
1	8	66	6	3	77	22
2	11	68	3	4	76	23
3	10	74	3	9	88	11
4	10	71	1	9	82	17
5	9	69	5	9	85	12
6	9	67	2	9	79	20
7	8	73	3	7	84	15
8	-	74	3	4	82	17
9	12	70	6	9	86	13
10	11	72	3	6	83	16
11	17	65	6	9	81	18
12	-	56	8	5	70	29
13	18	57	3	6	68	31
14	-	59	6	9	76	23
15	20	62	9	7	78	21
16	23	61	6	7	76	23
17	24	64	3	9	78	21
18	26	66	6	5	78	21
19	-	50	9	14	74	23
20	28	66	5	6	78	21
21	-	66	3	6	77	22
22	30	66	3	4	74	25
23	21	51	9	11	72	27
24	26	58	6	13	78	21
25	20	49	13	13	76	23
26	24	45	8	13	66	31
27	5	51	9	13	74	25
28	22	46	10	12	69	30
29	16	45	9	16	71	28
30	19	49	13	10	74	25
31	16	66	4	3	74	24

TABLE 23b:- SHIFTS OUT PER DAY FOR THE MONTH OF FEBRUARY 1975

Date	Number of ticket Machines Short	AS A PERCENTAGE OF 151 SHIFTS				
		Shifts on time	Shifts out 20–40 minutes late	Shifts out over 40 Minutes late	Total Shifts out	Short of Shifts
1	11	67	6	7	81	18
2	4	45	11	13	69	28
3	16	46	11	13	70	29
4	18	48	10	17	76	23
5	-	49	5	16	71	26
6	12	55	8	13	77	22
7	15	57	11	6	75	24
8	21	64	6	9	80	19
9	-	58	3	5	68	29
10	23	49	5	14	69	30
11	-	58	6	10	75	24
12	20	56	8	8	73	26
13	-	43	11	11	66	33
14	4	57	6	6	70	29
15	10	61	7	6	75	24
16	3	50	2	13	66	31
17	8	56	7	6	70	29
18	8	47	11	13	71	28
19	8	48	7	17	74	25
20	8	53	11	9	74	25
21	8	66	3	6	76	23
22	8	70	4	5	80	23
23	8	52	6	9	69	28
24	8	52	7	12	72	27
25	3	65	1	3	71	28
26	5	49	6	7	68	19
27	4	35	8	21	58	34
28	5	53	7	6	68	31

TABLE 23a:- [illegible] OUT PER DAY FOR THE [illegible] OF AUGUST 1975

	AS A PERCENTAGE OF 151 SHIFTS				
Date	Shifts on time	Shifts out 20-40 Minutes late	Shifts out Over 40 Minutes late	Total Shifts Out	Short of Shifts
5	66	7	11	85	14
7	62	8	15	86	13
8	60	3	17	81	18
9	66	6	11	84	15
10	61	6	17	86	13
11	61	3	22	87	12
12	68	6	13	88	11
13	66	4	15	86	13
14	66	5	7	79	20
15	63	7	10	82	17
16	70	7	14	92	7
17	61	7	9	79	20
18	54	13	16	84	15
19	60	6	18	86	13
20	62	10	13	86	13
21	60	9	15	85	14
22	63	5	15	85	14
23	61	11	16	89	10
24	68	10	11	90	9
25	58	5	14	79	20
26	62	5	13	82	17
27	60	3	17	82	17
28	60	8	11	80	19
29	60	3	16	82	17
30	54	8	17	80	19

From the Tables we can see the effect of pay day on the punctuality of crew and consequently shifts on time and those not taken. One needs to look at the deplorable conditions for every month from the 23rd day to the 3rd or 4th of the following month to realise that at least only half of the planned shifts are out on time. On each of the days in months of January and February some conductors could not work because of shortage of ticket machines. This problem has now been solved with advanced training of 13 ticket machine technicians.

3:3:2 OVERALL DISCIPLINE OF CREW

TABLE 24:- DISCIPLINARY CASES, 1974

Month	Careless Driving	Theft	Lost Trips	Absconding from Duty	Misconduct
January	28	7	4	3	18
February	4	6	9	-	10
March	7	28	1	-	6
April	7	20	4	1	16
May	14	20	3	1	25
June	6	34	6	4	24
July	8	31	19	14	58
August	1	78	2	9	13
September	5	58	5	23	18
October	10	19	34	13	-
November	11	20	33	15	10
December	8	28	46	7	4
TOTAL	109	348	166	90	201

Although these cases are petty but have an impact on the operation of the company, for one thing the offenders are suspended from duty pending the findings of the Worker's Conciliation Board. When found guilty they are dismissed from work but entitled to all benefits and the company has to recruit new crew who have to undergo both theoretical and practial lessons for 2 months before they are productive.

3:4 WORKMANSHIP IN WORKSHOP

The number of times a bus breaks down while on road on duty is a reflection on the proper maintenance of vehicles. The large the number of breakdowns constitutes not only economic loss to the undertaking in as much as it deprives productive utilisation of bus fleet in active services, but also inconveniences the multitude of passengers. While complete elimination of breakdowns is an impossible proposition, a substantial reduction can always be the target for achievement. This is possible if the workshop is manned by competent mechanics and technicians to cope up with maintenance and servicing duties which are very crucial for the functioning of the company.

3:4:1 MANPOWER POSITION IN WORKSHOP

Regular maintenance and servicing of buses depends to a large extent on the availability of skilled manpower. Table 25 below shows manpower strength in different job categories in the workshop.

TABLE 25:- MANPOWER POSITION, SEPTEMBER 1975

ENGINEERING DEPARTMENT

Chief Engineer (1), Engineers - all expatriates (4), Senior foreman (1), Senior Storekeeper (1), Store-Keeper (1), Store Clerks (27), Engineering Clerks (5), Foremen (14)

	Grade I	Grade II	Grade III	No Grade Including Learner Mechanics	Total
Mechanics	2	13	55	68	138
Fuel Pump Mechanics				2	2
Ticket Machine Mechanics				13	13
Electricians		8	9	10	27
Batterymen				5	5
Body Builders		1	3	1	5
Carpenters		4	4	8	16
Panel Beaters		1	1	1	3
Welders		3	3	3	9
Spring repairer				1	1
Radiator Mechanics				3	3
Painters			4	1	5
Signwriters		1		3	4
Turners		1	1		2
Apprentices			2	3	5
Greasers				2	2
Oilers				12	12
Storemen				4	4
Pump attendants				6	6
Tyre Fitters				16	16
Bus Cleaners				32	32
Garage cleaners				12	12
Fork Lift drivers				1	1

There is a very acute shortage of manpower both quantitatively and qualitatively in all sections of the workshop. The shortage is highly felt especially with electricians and mechanics particularly manpower for servicing Ikarus buses. If one looks at Table 26 showing the number of buses in UDA workshop and those in other workshops waiting for repair this is a clear and direct reflection of the consequences of this manpower shortage.

TABLE 26:- BUSES IN WORKSHOPS, 1975

Month	Total No. of buses in work-shops of UDA	Daily average No. of buses in workshops of UDA	Total No. of Buses in other Workshops	Daily average number of buses in other work-shops
January	3302	107	312	10
February	3385	121	274	10
March	3225	104	301	10
April	3310	118	211	8
May	4512	150	175	6
June	5087	170	111	4
July	5175	173	82	3

Note:-(i)The above data for the month of January and February does not include Ikarus buses which started operating on 1st March, 1975.

(ii)For the months of January and February UDA had a fleet of 311 buses. For the months of March - July there were 374 buses.

Buses in other workshops are those broken down or fault ones whose guarantee period has not expired, so that the supplier of the vehicle or his dealer has to meet repair charges. Some of these buses have very special defects which needs very specialized repairs and dealers have all the facilities and expertise to undertake such sophisticated repairs.

3:4:2 DEPOT FACILITIES

UDA has two depots, one at Kurasini and the other at Ubungo. Capacity of Kurasini depot is 240 buses. A new depot worth Shs 4 million was opened at Ubungo last year to deal with only Ikarus buses. Its capacity is 120 vehicles during this Phase 1. When the total project is completed (nobody knows when Phase 11 shall start) it is planned to increase the capacity to 250 buses. According to public transport experts the best recommended capacity for a depot is 150 buses where it is easy to service and maintain proper records.

The main problem with the workshop is that the machinery and equipment as well as the tools are insufficient and partly obsolete. New equipment is urgently needed to supplement and or replace existing ones. The Hungarian team which made a study on UDA recommended the purchase of 24 different types of equipment and machine tools by phases depending on the availability of finance[8].

The ordering of spares by UDA is done when the necessity arises and not in advance. As a result there is not enough spare parts in stock at any one period. The delays in ordering spare parts are increased by the slow delivery times by dealers. This keep a lot of buses out of use.

There is lack of system of compulsory checking when the vehicles are returned to the depots and part of the blame lies with the drivers who do not report the faults they discover while driving the vehicles.

3:4:3 BREAKDOWNS

On the road breakdowns interferes with the whole operation of the buses. Table 27 shows total mileage lost due to involuntary stops, as a result of breakdowns for year 1974 and part of 1975.

TABLE 27:- MILEAGE LOST DUE TO INVOLUNTARY STOPS

Year 1974:	January	554245	May	692438	September	450255
	February	544383	June	592273	October	489823
	March	658720	July	515178	November	487838
	April	871636	August	497625	December	543511
Year 1975:	January	616047	February	588377	March	1470549

Tables 28 and 29 are a summary on the number of breakdowns per month, their nature/causes.

TABLE 28:- NUMBER OF BREAKDOWNS PER MONTH 1975

Month	Mechanical	Electrial	Accident	No Fuel	Other	Total
January	446(35.5%)	564(44.9%)	35(2.7%)	78(6.2%)	132(10.5%)	1255(100%)
February	458(38.6%)	545(46%)	19(1.6%)	76(6.4%)	86(7.2%)	1184(100%)
July	414(40%)	437(42.6%)	43(4.1%)	38(3.7%)	93(9%)	1025(100%)
August	365(41.6%)	351(40%)	40(4.5%)	40(4.5%)	81(9.2%)	877(100%)

TABLE 29:- HIGHEST DAILY RECORDED FIGURE ON BREAKDOWNS IN EACH MONTH 1975

Month	Mechanical	Electrical	Accident	No Fuel	Other	Highest daily figure
January	26	28	4	6	14	56
February	28	27	4	9	6	58
July	18	36	4	5	7	56
August	19	23	3	4	5	47

From Tables 28 and 29 above it can be seen that the average monthly number of breakdowns for all categories declines gradually from 40 in January, 42 in February to 33 in July and 28 in August. This is a healthy sign indicating that at least the management has taken corrective measures against this problem. The main weakness lies with the Engineering Department which is slow to react to breakdowns for there is a big time lag between when a breakdown is reported and when the vehicle is attended to. It is possible to reduce the mileage lost if the response by the Engineering Department to breakdowns is quick.

3:4:4 OPERATING RATIO

Considering the fact that the fixed costs (which includes registration tax, insurance, debt charges, depreciation, etc which are to be incurred even when a bus is off the road) constitutes something like one-third to two fifths of the total operating cost of bus per year, it is most advantageous to press into service as many buses as possible if those buses can fetch revenue sufficient to recover the variable costs which amount to something like

60 to 70% of the yearly total operating cost. Since it is never feasible to put the entire fleet on daily operation, a distinction is drawn between the number of buses held and actual number of buses on the road. The difference between these two figures indicates the size of idle fleet which is accounted for by minor and major repairs, spare buses etc. After making due allowance of 10% for such contingencies, it is generally recommended that as an ideal standard the aim should be 90% fleet utilisation in order to achieve maximum operational efficiency.

TABLE 30:- TOTAL BUSES OUT ON A DAY AS A PERCENTAGE OF TOTAL UDA FLEET

Date	January 1975	February 1975	August 1975
1	43	44	-
2	42	42	-
3	47	43	-
4	44	46	-
5	46	45	46
6	43	49	-
7	46	45	47
8	45	50	44
9	47	45	44
10	42	46	46
11	46	47	44
12	42	46	44
13	40	43	46
14	44	46	43
15	45	46	44
16	44	42	48
17	44	46	41
18	46	45	42
19	43	48	45

Table 30 continued

Date	January 1975	February 1975	August 1975
20	45	46	45
21	45	48	45
22	44	50	45
23	42	46	47
24	46	46	47
25	45	45	43
26	40	46	42
27	46	42	43
28	42	46	41
29	43	-	43
30	45	-	42
31	45	-	

Table 30 shows the total number of buses out per day as a percentage of total fleet. The data reveals that there is a big discrepancy between the actual number of buses despatched and the total fleet held. In most of the days more than 50% of the fleet can not be operated mainly because of mechanical, electrical and other faults. The main reasons which cause this situation are: shortage of well skilled workers, lack of continuous maintenance, persistent shortage of spare parts, the relatively high number of the models run by the company and the bad conditions of the roads in the city. The ratio between total bus fleet held by UDA and number deployed per day is:-

1: $< \frac{1}{2}$

Ways and means must be devised to ensure high productivity in the Engineering and Traffic Department if the Company is to make progress in future.

3:5 RECURRENT AND CAPITAL EXPENDITURE PATTERN-INCREASE IN PRICE OF UDA INPUTS

We have already seen how road conditions in Dar-es-Salaam affect the smooth operation of bus service. The second problem beyond the control of UDA is the increase in prices of inputs in terms of cost (price) of buses, petroleum, spare parts and repairs, bus shelters, insurance, customs duties, tyres, lubricants, salaries, uniforms, training, repayment of matured loans to former owners and Tanzania Government etc, arising from the global inflation and general world wide economic recession with the countries of the Third World being at the centre of the crisis the control of which is beyond their capacity.

Graph 5 is a summary of Revenue and Operating Costs for 1969-1973. The very drastic drop in profits can be attributed to the rising cost of every item and the repayment of matured loans and other financial commitments the company has to meet. Financial statements for 1974 and 1975 are still being worked out by the auditors. For UDA both the recurrent and capital expenditures are financed, by fares. The current bus fares were raised on 1st September 1974 to curb the ever rising trend of the Company's expenses as compared with the revenue. The existing fares were determined in such a way that they would not have to rise again in the near future, at least not before 1978, all things being equal. According to UDA estimates/ extrapolations, fares will rise again by 30% in 1978. UDA should strive to reduce the operating costs by using various strategies and approaches to be dealt in next chapter.

Footnotes

7. Source: UDA, Personnel Department
8. Public Transportation System of the City, Dar-es-Salaam, prepared by a team of Hungarian experts sponsored by TESCO (unpublished report) page 33.

C H A P T E R 4

POLICY RECOMMENDATIONS AND PRIORITIES FOR PROMOTING THE USE OF PUBLIC TRANSPORT

4:0 INTRODUCTION

The current situation of urban public transport in Dar-es-Salaam is well elaborated in Chapters 2 and 3. As a matter of fact, possibilities do exist for combating the deterioration in public transport if strong action is taken in three interrelated fields. Firstly, more rational use of transport facilities, particularly of road space in congested areas, must be ensured. Secondly, new management and operational improvements in UDA are needed. Lastly, operational improvement should be made by introducing "new Services"

The following aspects are given due consideration in working out proposed policies and action areas:-

(a) evolving of alternative solutions worked out on the basis of existing conditions as spelled out in chapters 2 and 3 and selection of the best of the solutions evolved.

(b) adoption of such proposals which also provide scope for effective use of existing facilities and

(c) taking into consideration of the financial ability of UDA and society and fixing of priorities and phased implementation of the proposals.

Dar-es-Salaam's public transportation problems ought to be tackled in two phases (i) the immediate improvement to optimise the existing facilities and (ii) designing of transport

facilities for meeting the additional demand in future.

4:1 PRIORITY NO 1: Traffic Management and Regulation Measures

The principal objective of public transportation planning is to ensure satisfactory circulation system and to achieve this objective certain structural changes are to be made in the sphere of traffic operation and transport network. Since it involves huge financial outlay and a longer period of time to effect the desired structural changes, the traffic management schemes are considered as ideal short term measures to tide over immediate exigencies and to facilitate efficient and safe flow of buses. In other words, while the long range planning is towards evolving of a network of roads to suit the present as well as future needs of traffic, traffic management schemes manifest themselves in conditioning the traffic to the existing network of roads by making best use of the available facilities.

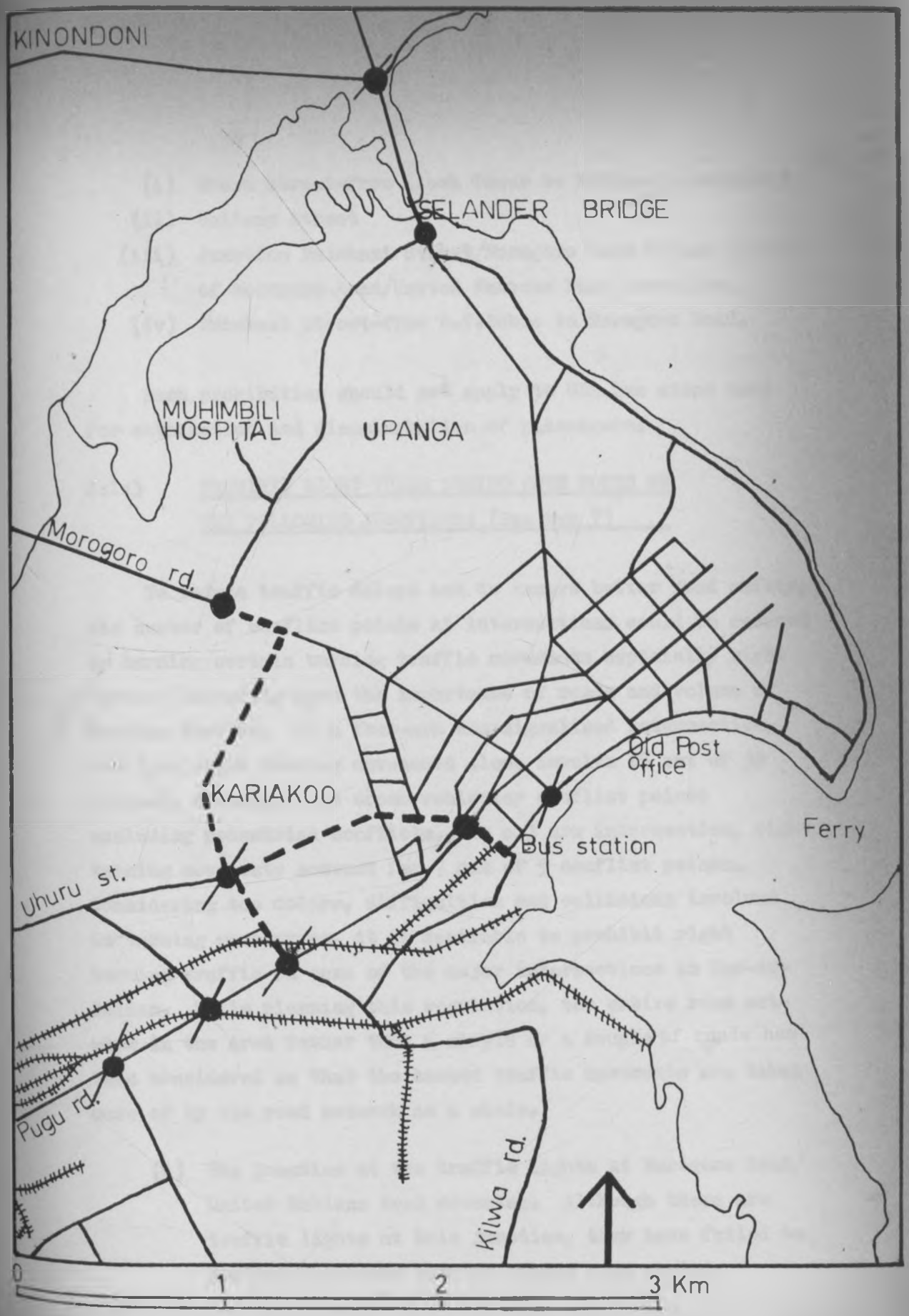
The following traffic management schemes are considered as ideal short term measures:-

4:1:1 PROHIBITING PARKING ALONG MAIN ROADS USED BY BUSES

One way of reducing traffic congestion is to eliminate or control parking at the side of the road because parked vehicles cause congestion simply by occupying road space that could be used by moving vehicles, thus reducing capacity. This is especially noticeable if the parked vehicles are at, or close to an intersection.

Accordingly, parking on the main roads in the CBD area used by UDA buses where traffic is intense and the roads are narrow should be prohibited immediately along the following roads:- (see map 7)

MAP 7 TRAFFIC MANAGEMENT SCHEMES (PROPOSED)



Prohibit parking

Traffic lights or Police control

Ban right turns

EDGAR H BEREGE,
Dept of Urban & Regional Planning, University of Nairobi; 1975/76.

(i) Uhuru street-from Clock Tower to Msimbazi roundabout

(ii) Railway Street

(iii) Junction Msimbazi Street/Morogoro Road to the junction of Morogoro Road/United Nations Road Crossings.

(iv) Msimbazi Street-from D.T.Dobie to Morogoro Road.

Such prohibition should not apply to UDA bus stops used for embarkation and disembarkation of passengers.

4:1:3 PROHIBIT RIGHT TURNS DURING RUSH HOURS ON THE FOLLOWING JUNCTIONS: (See Map 7)

To reduce traffic delays and to ensure better road safety, the number of conflict points at intersections could be reduced by banning certain turning traffic movements especially right turning depending upon the importance of roads and volume of turning traffic. At a four-arm non signalised intersection, the four right turning movements alone involve 16 out of 32 merging, diverging and cross vehicular conflict points excluding pedestrian conflicts. In a 3 arm intersection, right turning movements account for 7 out of 9 conflict points. Considering the delays, difficulties and collisions involved in turning manoeuvres, it is desirable to prohibit right turning traffic on some of the major intersections in Dar-es-Salaam. While planning this regulation, the entire road network in the area rather than a single or a couple of roads has been considered so that the banned traffic movements are taken care of by the road network as a whole.

(i) The junction at the traffic lights at Morogoro Road/ United Nations Road crossing. Although there are traffic lights at this junction, they have failed to control the heavy traffic during peak period.

(ii) The junction at the traffic lights at Selander Bridge.

The main difficulty associated with the introduction of

right turn restrictions is that of finding alternative routes that are suitable with regard to width and structure. Such problems are non existent in Dar-es-Salaam. For example in case of Selander Bridge, traffic from United Nations Road intending to enter Upanga Road can do so through Diamond Jubilee Road and other access roads. At the same time traffic on Upanga Road intending to enter United Nations Road can do so via the roundabout at Palm Beach Hotel. Alternative routes are also available at the other junction where right turning is to be restricted. The buses should be exempted from the right turn ban. Although this may cause some minor confusion, a few buses turning right without opposition from other right-turners can usually be accommodated without loss of efficiency.

Of particular importance is the attention that must be paid to the signing of the diversions. The turning restrictions should be indicated to the motorist by conventional signs mounted on posts, but if the prohibitions are in force only during the peak periods of the day then they can be advantageously indicated by overhead neon signs which light up only during the critical times.

4:1:3 TRAFFIC LIGHTS SHOULD BE INSTALLED AT THE FOLLOWING ROAD SECTIONS OR MANUAL CONTROL OF TRAFFIC BY POLICE SHOULD BE INTRODUCED DURING PEAK PERIODS AT THE FOLLOWING POINTS

(See map 7)

(i) Clock Tower roundabout

(ii) Pugu Road and Chang'ombe Road junction - since a dual carriageway is under construction, there is no doubt that traffic lights will be provided here.

(iii) D.T. Dobie junction - traffic lights will definitely

be installed here as the junction lies along Pugu Road which is being re-constructed.

(iv) Msimbazi Street and Uhuru street roundabout

(v) Uhuru Street and Libya Street roundabout

(vi) Msimbazi Street and Morogoro Road junction

(vii) Bagamoyo Road/Kinondoni Road/Kenyatta Drive junction and

(viii) Morogoro Road/Morocco Road junction.

A sample survey was made by the National Transport Corporation at the junction of Pugu Road, Bandarini Road, Msimbazi Street and Nkrumah Street (i.e. D.T. Dobie junction) during the month of August 1974, to see how vehicles were flowing during the peak hours.

The result of that survey indicated that during peak hours (7.30 - 8.30 a.m.) there were on the average 720 vehicles per hour passing through the check point from Pugu road, 360 vehicles per hour from Msimbazi Street, 300 vehicles per hour from Bandarini Road. The figures at Morogoro road and United Nations road junction were even higher. From Magomeni to town 1,080 per hour, from United Nations to town 860 per hour, from town to United Nations road 200 per hour and from town to Magomeni 540 per hour. Hence the total number of vehicles at these two crossings are 1,620 and 2,680 respectively.

D.T. Dobie junction takes 7.8% of the total vehicles during the peak period while United Nations Road/Morogoro Road takes 13% of the total vehicles in the city. Assuming that this percentage will be retained up to 1985 in the two junctions, the number of vehicles will be as shown below:-

ESTIMATED TRAFFIC FLOW AT TWO JUNCTIONS

(per hour)

Year	Vehicle Population in Dar-es-Salaam	D.T.Dobie Junction	U.N/Morogoro Road
1975	20,700	1,620	2,691
1976	20,800	1,627	2,704
1977	20,900	1,634	2,717
1978	21,000	1,642	2,730
1979	22,000	1,650	2,860
1980	23,000	1,729	2,990
1981	24,000	1,807	3,120
1982	25,000	1,965	3,250
1983	26,000	2,043	3,380
1984	27,000	2,122	3,510
1985	28,000	2,200	3,640

Source:- National Transport Corporation, Research and Planning Department.

Note:- In 1967 the number of vehicles in Dar-es-Salaam was 14,270. The growth rate between 1959 and 1967 which has been assumed to continue up to 1970 is 9.2%. Due to restriction imposed on importation of cars in 1970 the growth rate fell to about 5% till 1974 when more stringent measures were taken, depressing, for the coming three years the growth rate to 0.5% per annum. It is assumed by National Transport Corporation that the growth rate will be back to its 5% per annum after 1977. Using this information the table above was computed with results as shown.

4:1:4 MANPOWER REQUIREMENTS AND CREATION OF MACHINERY TO CARRY OUT TRAFFIC MANAGEMENT MEASURES

Many of the above measures can be implemented at little expense, and only a few require any considerable outlay. The measures can be carried out only if there is close cooperation between Police, Regional Development Directorate and the general public. This calls for increasing the number of traffic police in the city. The City authorities could utilise the services of existing parking metre readers to enforce anti-parking regulations in appropriate areas. Those who contravene the anti-parking rules could be dealt with in the same manner as defaulters who do not pay parking charges in metered areas.

In the short run and in the CBD area the traffic regulations appear to offer prime solutions. Therefore, it needs to be emphasised that traffic management schemes should be looked upon as stepping stones rather than as substitute for large scale and long term development planning.

4:2 PRIORITY NO. II : IMPROVEMENTS IN CONVENTIONAL TRANSPORT OPERATION THROUGH MEASURES TO BE TAKEN BY UDA AND THE GOVERNMENT

The Company should introduce the following measures, some of the modern conventional methods essential to a public transport concern in Tanzania. After a careful diagnosis of the internal problems facing UDA these measures will minimise costs of operating a bus system and at same time offering optimum services.

4:2:1 TRAINING PROGRAMMES

The importance, for UDA, of drawing up very concrete training programmes need not be emphasised. The main objectives

of training should be to:-

(i) enhance the skills of the workers so as to give them a chance to rise in their position in the transport industry and attain a higher standard of living.

(ii) enable employees to perform their duties diligently

(iii) educate the workers to realise, understand and appreciate their role and contribution to the economy of the nation as a whole and

(iv) improve the standard of job supervision especially in the workshop and in Traffic department.

The Company should continue to organise short and long courses, Seminars, conferences and workshops etc, for all staff offered in various institutions and establishments in the country and abroad.

The number of vacant posts in each department was indicated in section 3:1:2. For those posts held by expatriates the main aim should be to localise them within the shortest possible time. The training programme should not be rigid but flexible and adjusted from time to time according to the priorities and needs of UDA and availability of finance and external sponsors. Emphasis should be on quality rather than quantity although the two are equally important. On-the-job and in-service training should be complementary.

4:2:2 INCENTIVE WAGE (BONUS SYSTEM)

The best way possible to make better utilisation of drivers, conductors and mechanics is by introducing an incentive wage which can be effected in the following ways:-

The Company has data on expected amount of fare to be collected

by conductors for each route per shift, given that there are few interruptions to time and duty schedules.

(a) If a conductor nets more than the minimum expected fare then he should be entitled to 5% bonus of amount over and above what is expected.

(b) On top of (a) above, a monthly target should be set for every conductor, say Shs 13,000/= per month and if he collects beyond this he should be entitled to say, Shs:50/= as bonus.

(c) If the conductor works for more than 15 days but not a full month because of either going on leave or coming back from leave, he should also be entitled to bonus depending on the amount he collects for the days worked.

(d) What has been said to conductors in (a), (b), and (c) above should also apply to drivers.

(e) for drivers of articulated buses (Ikarus 280) each of which is manned by 2 conductors, the only way to determine the financial productivity of such drivers is by taking the average between what has been collected by both first and second conductor e.g. if conductor X collects shs.870/= and conductor Y shs.930/=, then the total for the driver shall be $\frac{870/= + 930/=}{2}$ = Shs.900/=

(f) for mechanics in workshops an element of standard time for each job has been determined by the manufacturers of each vehicle model. A mechanic should be entitled to incentive wage only if he works for lesser time than the planned repair operation times for each type of work.

(g) A mechanic entitled to bonus should have a good working

record, not absenting from duty, always punctual and never absconds from work. There are many instances where buses have broken down mysteriously soon after having been to the garage either for servicing or repair. On looking at the fault, it has been found that the cause was bad workmanship of the mechanics. Mechanics with such records of negligence should not be entitled to incentive wage.

Every UDA employee in workshop should have a time card for a week and time keepers should record number of hours worked by every mechanic. From this it is possible to identify mechanics who attain and those who work beyond the standard times. Operations time in workshop depends on availability of equipment and spares, space and good diagnosis of defects or faults before repair work begins. To accomplish this successfully, it is recommended that more foremen should be recruited and trained for supervisory work.

Incentive wage system will be meaningful only if there is genuine reduction in overtime employment in the Engineering and Traffic Departments.

In order to fully implement the above scheme there is need to establish in both Departments an office solely to deal with bonus system. To ensure a high standard of honesty, an inspector should record in the job card all faults to a vehicle. A mechanic should record on the very job card, time of starting repair work. On completion of repairs another inspector should certify whether the work is excellent, good, satisfactory or not. If the output is not good, the responsible mechanic must be told to do it over again. Here inspectors must be very honest.

4:2:3 SCHEME OF SERVICE

Scheme of Service for different job categories and grades

should be drawn up as a matter of urgency. This exercise shouldn't occupy UDA much time since such schemes exist in most of Nationalised companies and in all Government ministries in the country. UDA management should copy what is already existing (with some modifications) and seek the support and approval of the National Union of Tanganyika Workers, the Standing Committee on Parastatal Organisations and the Ministry of Labour.

4:2:4 DISCIPLINARY MEASURES

The conduct of employees in Tanzania is governed by the Security of Employment Act of 1964 revised in 1974. Briefly, the actions taken against employees with disciplinary cases are: 1st breach written warning, 2nd breach reprimand, 3rd breach severe reprimand, 4th breach fine (a deduction not exceeding one day's pay from the wages of an employee), 5th and subsequent breach summary dismissal.

Deducting employees salary should be the most tangible permissible penalty the Company should enforce even to the first offenders, particularly crew members who report for duty e.g. 2 hours or more after the scheduled time. At the end of month(pay day) drivers and conductors with bad punctuality record should earn less than others. Furthermore those with a bad work record should not be entitled to bonus wage. During the period when the author was attached to UDA he noted that it was a very common practice among drivers, conductors etc to apply for salary advances (other than mid-month salaries) and loans to meet incidental expenses. The management should see to it that only disciplined workers should be eligible for loans and or salary advances.

4:2:5 SUBSIDIES

UDA is operating in a situation where it has to purchase its inputs, hence depending on the revenues it receives from the

public, it may make an accounting (cash -flow) profit , or loss.

If we examine Table 31 and 32 on cash inflow and outflow estimates for the years 1975-1978 we see that the Company will operate at a deficit starting from this year, 1976, up to 1978. It is likely that the loss in whole or in part should be paid for by the Government in form of subsidy to meet the financial obligations and acquisition of additional fleet.

The government has been subsidising nationalised industries from time to time since 1967. Treasury funds have been given as grants or loans or equity. Some of the nationalised industries have been incurring losses because of excessive subsidy which in some cases has supported management inefficiency in the country. In reaction to this, it is now the declared Government policy not to give subsidies to nationalised industries and especially those incurring losses. Those which fail to generate surpluses will have to be closed down. By introducing this directive, the Government hopes that employees in all parastatals will work hard to ensure that their companies succeed lest they be closed down.[9]

Such an action is justified in some cases, but in the advent of UDA operating at a deficit, does it imply that the Government will bring to a halt public transport system in Dar-es-Salaam? The answer is obviously NO! UDA cannot go on borrowing from the Banks to overcome the deficit since it would mean accummulating more debts and hence heavy financial burden. There is therefore, a need for Government to step in and subsidize the Company. A subsidy in this case will serve as a temporary alleviation to an otherwise loss making UDA. After all UDA is an infant industry (institution) which inherited a number of problems at the time of nationalisation .

One may argue that for UDA to meet all her financial obligations the best course of action is to raise the fares to a level where

BUDGETED - CASH FLOW - ALL FIGURES IN THOUSANDS.

CASH INFLOW ESTIMATES FOR THE YEAR 1975 - 1978.

		1975	1976	1977	1978
A.	NET MARGIN FROM OPERATION	Shs.	Shs.	Shs.	Shs.
	Ordinary Buses/Mini Buses	6,629	*(9,750) deficit	*(7,900) deficit	4,500 (a)
B.	ADD PROVISIONS MADE.				
	Depreciation	10,365	9,795	10,470	10,690
	Interest	2,170	2,170	2,170	2,170
	Staff Pension	784	1,570	1,570	1,570
	Insurance	2,896	-	-	-
C.	ADD CAPITAL RECEPTS.				
	Equity	15,000	-	-	-
	Loan	4,000	-	-	-
	Sale of Buses	90	100	100	100
D.	TOTAL	41,934	3,885	6,410	19,030
E.	OPENING BALANCE	57	8,044	(8,806)*	(16,741)*(b)
F.	GRAND TOTAL	41,991	11,929	*(2,396) deficit	2,289

(a) 30% Fare Increase

(b) Need for more equity - Shs.15m. This would enable to meet financial obligations and equisition of additional fleet.

* Deficit - the Co. has to find cash from some other source, probably Govt

TABLE 32 BUDGETED CASH OUTFLOW

(All figures in thousands)

	1975	1976	1977	1978
1. INTEREST & OTHER PAYMENTS.				
(N.T.C.) Grindlays	55	50	45	40
Fiat	31	-	-	-
Karadha	157	-	-	-
Mogurt	1,022	900	700	600
K.J. Motors	42	-	-	-
T.I.B.	480	480	370	260
Staff Pension	1,568	1,570	1,570	1,570
Insurance	2,500	-	-	-
IMPORT DUTY				
(i) Ikarus Buses	4,057	-	-	-
(ii) Ikarus Spares	1,000	-	-	-
(iii) Ikarus Freight	4,000	-	-	-
(iv) Wharfage (Ikarus)	700	-	-	-
Central Bus Stand	150	-	-	-
Ext. Kurasini Depot	1,300	5,500	-	-
3. LOAN REPAYMENT				
(N.T.C.) Grindyals	800	800	800	800
K.J. Motors	542	-	-	-
Mogurt - Hungarian Co.	4,204	2,700	2,700	2,600
Mogurt - 3 buses	232	465	-	-
Karadha	1,310	-	$\frac{3}{4}$	-
Fiat	624	-	-	-
T.I.B.	-	1,880	1,880	1,880
4. PURCHASE OR CAPITAL ASSETS.				
Garage equipment	400	400	300	300
Ubungo Workshop	6,500	2,000	2,000	2,000
Tel - Installations	211	-	-	-
Replacement of breakdown	100	100	100	100
Ticket machines	175	200	200	200
Stores Accounting machines	60	-	-	-
Staff cars	370	100	110	125
Staff Quarters	1,135	500	500	500
Other Assets	222	70	50	50
Rehabilitation of buses	-	2,000	2,500	-
Kurasini- Double Fence	-	500	-	-
Licence & Permits	-	520	520	500
5. TOTAL	33,947	20,735	14,345	11,525
6. CLOSING BALANCE	8,044	(8,806)*	(16,741)*	(9,236)*
7. GRAND TOTAL	41,991	11,929	(2,396)*	2,289

marginal revenue is greater than marginal cost. Such an action is irrational because a decision to allow a fare rise is inflationary on the scope that wage demands would be stimulated thereby. This has been the case in recent years.

It is an average worker or a common man who will suffer from such an increase in fares. At present, minimum wage earners in parastatals and private Companies on one hand and Government on the other, spend 15% and 13.6% of their monthly gross salaries (shs.340/= and 380/=) for journey to and from work respectively. This does not include other trips taken leisurely. Raising the fares above Shs.1/= level would thus adversely affect the cost of living of the lowest paid strata in the city who spend about 60% of their gross monthly salaries on housing (including house rent, cost of electricity, water, food etc.). Some of them stay with their families and have school-going children who also need money for fare to and from school. The cost of living is always going up, the prices of some items has trebled during the last six months.

The most appropriate form of subsidy here is for the Government to inject more funds to UDA for construction of new sub-depots (see section 4:2:7 below) and purchase of new fleet during 1976-1978 period while leaving UDA to meet other financial obligations including paying back all the loans. During 1976-1978 period UDA is planning to purchase 60 mini-buses and 30 maxi buses other than Ikarus. During same period, 10 mini-buses and 69 maxi buses (other than Ikarus) have to be scrapped. The Company is not intending to purchase any Ikarus buses before Year 1979. The Government should meet the costs of all these new buses.

Some people might argue that subsidies may support management inefficiency in UDA, but the case here is a bit different in that, for the Company, capital for expansion is a major problem. UDA must purchase more buses to replace those

to be scrapped, to serve the expanding population and demand.

In many countries of the world, both in capitalist and socialist camp, the idea of subsidy for public transport is accepted.[10]

4:2:6 INTRODUCTION OF FLAT RATE FARE SYSTEM

The existing fare structure poses a few more problems on top of those pointed out in Chapter 3 (section 3:2:4). Perhaps the following diagram would help to explain the problem more explicity. A passenger travelling between Stage 1 and 3

pays shs 1/=. One travelling between 1 and 2 or 3 etc pays cents =/50. But one travelling between A and B is required to pay shs 1/= despite the fact that the distance between A and B is equal to 1 and 2 or 3 for which cents =/50 is the charge. This is the inadequancy of the "stage fares"

To be fair, UDA should introduce a flat rate fare system whereby passengers have to pay same fare regardless of distance travelled by one bus. With the retention of the existing bus route network (single direct bus route network) such fares would work to the advantage of both passengers (particularly those travelling on long distance) and UDA.

The proposed fare should be Shs.1/= for one trip. This rate is justifiable because at present very few passengers travel short distances and pay cents =/50, otherwise the majority of bus riders go for long trips and pay shs 1/=.

With the introduction of new flat rate fare, the cost of journey to and from work will still remain at the current level i.e. sh 2/=.

In Chapter 2 Section 2:8 the author has projected the expected number of passenger trips per annum for the period 1975 - 1980. If we assume that 10% of the expected yearly number of trips shall not be taken by passengers who opt to walk or use bicycles due to fare rise, then total revenue collection for the years 1975 - 1980 shall be as follows:-

Year	Expected number of passengers	Yearly expected revenue in shs.(assuming 10% of expected trips are not taken)
1975	102,000,000	91,800,000
1976	108,000,000	97,200,000
1977	114,000,000	102,600,000
1978	122,000,000	109,800,000
1979	129,000,000	116,100,000
1980	137,000,000	123,300,000
1981	145,000,000	130,500,000
1982	153,000,000	137,700,000
1983	163,000,000	146,700,000
1984	172,000,000	154,800,000
1985	183,000,000	164,700,000

With the introduction of flat rate fare system there is no doubt that (other things being equal) UDA will earn sufficient cash to pay the loans, undertake major expansion

programmes in terms of fleet size, manpower, workshop and equipment etc. This does not rule out Government subsidy to UDA. Seasonal tickets should be abolished with introduction of new fare structure.

4:2:7 OPEN NEW SUB-DEPOTS

Due to problems associated with the physical layout of the city with widely dispersed populations and functions and activities, it is difficult for the existing 2 depots to cope with demand for both minor and major repair works in cases of on the route accidents and breakdowns which are very frequent in Dar-es-Salaam. Construction of 3 new sub-depots to supplement the existing ones is therefore of priority. These should specialise on minor servicing and repair work. One such depot could be located at Temake to serve south western part of the city, the second in Kinondoni to serve eastern and central areas and lastly at Mburahati to serve the western zone. The main depots should deal with major repair works and (engine) overhauls. Again the Government should come in and provide initial capital to the project in form of subsidy.

4:2:8 STANDARDIZATION OF FLEET

To ensure proper and regular maintenance and servicing of vehicles it is recommended that UDA should stock only three vehicle makes. After considering all design aspects of vehicles and other factors such as cost, capacity, convenience, economic life etc as discussed in Chapter 2 section 2:6 and 2:6:1 the author recommends that UDA should phase out all Benz fleet within the shortest possible time since they have proved a failure on both city and up-country services. Fiat buses should also be phased out because they are very costly and even its spares and cost of operation is very high. Consequently UDA should remain with only Ikarus, Leyland and Isuzu fleet.

4:2:9 MANUFACTURING AND RECLAMATION OF SPARE PARTS

The Government's move to open up a Central Workshop to service all subsidiary companies of the National Transport Corporation N.T.C. - (UDA, National Bus Services, National Road Haulage Company etc) - is a welcome decision. It is hoped that in future major repairs and reconditioning of principal units is to be done at this workshop. The project would promote economy in the use of spare parts and would eliminate the problem of procuring spares in time from the dealers and other private agents. When the workshop is fully established its activities can be expanded to cater for needs of vehicles belonging to other companies as well as private operators.[11]

With the standardisation of vehicles it will be easier for this Workshop to reclaim and manufacture spare parts for the few vehicle models UDA and other NTC subsidiaries will be operating. This is feasible. The Ministry of Communications, Mechanical Transport Depot, in Dar-es-Salaam, has been manufacturing the following spares since October 1973 for Land Rovers, Bedford, BMC, Mini Moke and Gardener vehicles: cylinder liners, gear and gear boxes, brake drums, tyre lines, rubber wheel cups, bolts and studs, liners and other workshop tools etc. Furthermore, the following spares are being reclaimed from scrap metal and re-used:- batteries, leaf springs, crank shafts, shock absorbers, armatures, carburettors, alternators, gear boxes, differential starters and dynamos. The central Workshop should be in a position to undertake similar activities. Importation of expatriates to supervise and train local personnel in this matter is very essential. Availability of local manpower will not be a problem since the National Institute of Transport - School of Motor Vehicle Mechanics - will produce its first graduates, at diploma level, from year 1978.

4:3 PRIORITY NO. III : OPERATIONAL IMPROVEMENTS MADE BY INTRODUCING "NEW SERVICES"

The purpose of these measures is to diminish the disadvantages for the passenger in conventional public transport operation by improving the existing routes, eliminating intermediate stops (express services), introducing limited stop services, providing "special" services to match specific type of demand, expanding services of mini buses and staggering working and school hours.

4:3:1 ROUTE IMPROVEMENT

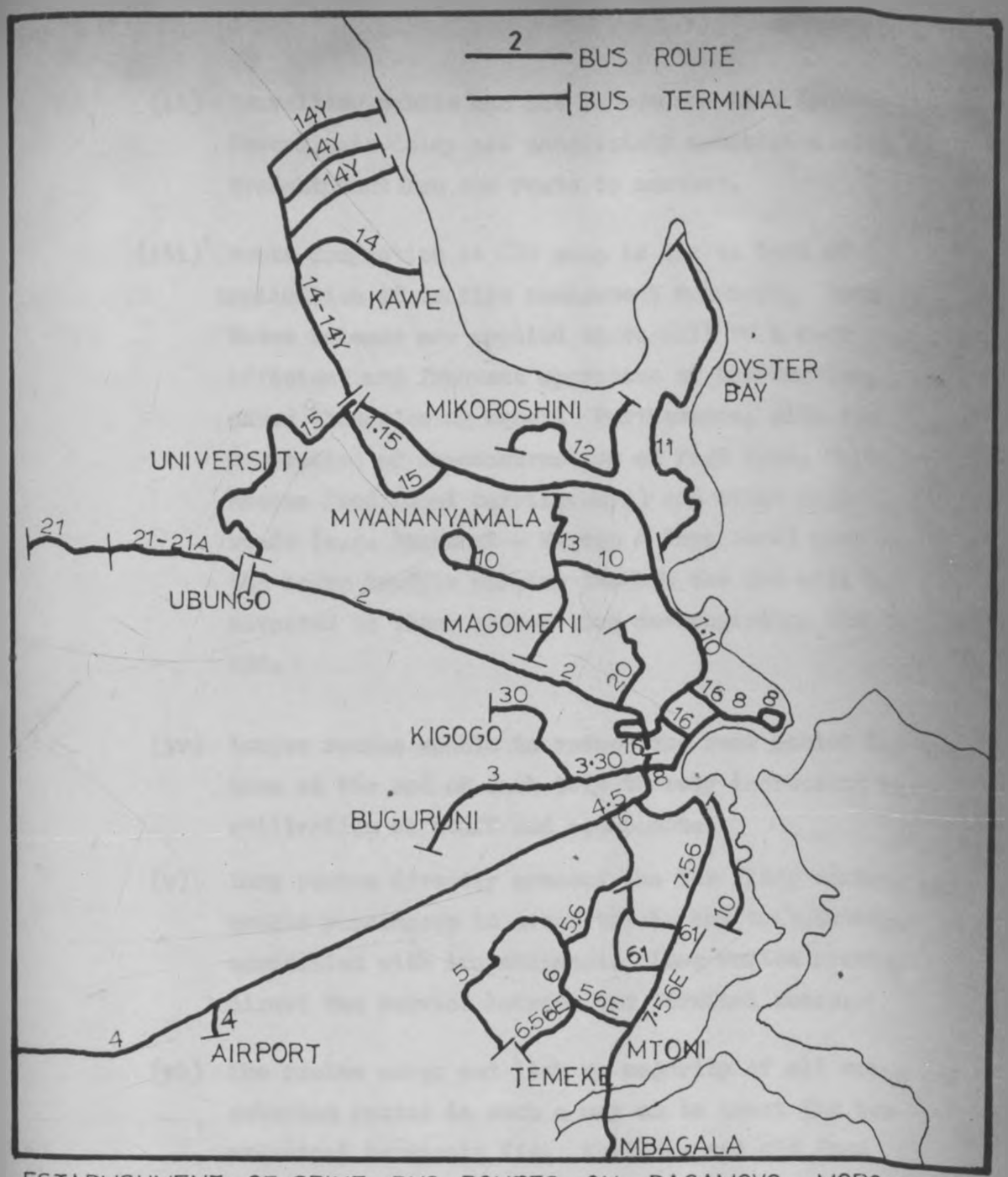
Arguments have been raised by a team of Hungarian consultants over the short-comings of the existing bus route network.[12]

The Hungarian team had recommended the introduction of Short Route System (SRS) to substitute the existing Long route System (LRS). See map 8. Schedules were prepared and the new routing system was implemented in May last year. Nevertheless, the whole scheme became a failure and was abandoned after one week and the current LRS was re-introduced.

The author strongly recommends the retention of the present system of single direct bus route network with the introduction of traffic management measures. We have already discussed the main characteristics of this network in Chapter 2 section 2:3:1 and from this the advantages far outweigh the disadvantages:-

(i) Persons travelling from one corner of the city to another have to travel generally by not more than one route and pay low fare ranging from cents ₵/50 to shs 1/= and shs 1/50 as the maximum.

MAP 8 SHORT ROUTING SYSTEM, MAY, 197



ESTABLISHMENT OF SPINE BUS ROUTES ON BAGAMOYO, MOROGORO, PUGU, UHURU AND KILWA ROADS.

FEEDER BUS ROUTES WERE LINKED TO THE SPINE ROUTES ACCORDING TO THE PRINCIPLE OF THE SHORT ROUTE SYSTEM

EDGAR H BEREGE, DEPT OF URBAN & REGIONAL PLANNING, UNIVERSITY OF NAIROBI 1975/76.

(ii) Travelling public has not to contend with inconvenience, in-ordinate delay and uncertainty associated with the transhipment from one route to another.

(iii) Route congestion in CBD area is due to lack of application of traffic management measures. Once these schemes are applied there will be a very efficient and frequent operation of bus service, other things being equal. Furthermore, with the completion of re-construction of Pugu Road, Port Access Road (dual carriageways) and other ring roads (e.g. Magomeni - Kigogo - Pugu Road) much of the heavy traffic passing through the CBD will be diverted to these routes thus de-congesting the CBD.

(iv) Longer routes enable to reduce the rest period for the crew at the end of each trip thereby increasing the utilisation of staff and equipment.

(v) Long routes directly connect the far flung centres and enable passengers to avoid trials and tribulations associated with transhipment. Long routes provide direct bus service between two terminal zones.

(vi) The routes merge and link up majority of all urban and suburban routes in such a way as to treat the two principal terminals Viz. Kariakoo and Old Post Office as intermediate stations in the linked up routes. The routes have either the origin or destination or both at far corners of the city where the congestion is totally absent, and their continuation through the principal terminals do not create problems since these terminals are no more than pick-up points for which the duration of stoppages is bound to be much less or negligible.

4:3:2 EXTENSION OF BUS SERVICE TO SITE AND SERVICE AREAS

New routes should be introduced to serve the population in four site and service areas and other development areas not covered by the existing system. The new site and service areas, still under development, are planned for the following population: Sinza 45,000, Kijitonyama 16,000, Mikocheni 26,000 and Tabata West 100,000. See Map 9. These areas are not directly served by buses and bus routes, in some cases there are no bus services at all and people have to walk a good distance to the main roads to catch a bus. Residents of Tabata West are the most neglected since there are no bus routes in the area. There are no internal or feeder bus routes in Kijitonyama, Sinza and Mikocheni to link with the main bus routes along Morogoro Road, and Bagamoyo Road.

It is premature to decide on the number of buses to be allocated to these areas. A plan for the extension of UDA services to the areas cannot be worked out without knowing the time and the number of people moving into them. UDA must therefore, cooperate with Ministry of Lands, Housing and Urban Development authorities and the respective District Development Directors in each District to get information about this. Many plots are filled by relocation from the present squatter areas, and it is equally important to know the areas where the population is at the same time reduced.

4:3:3 NEW BUS ROUTES TO BE OPENED

The new roads outside the city centre which are either under construction or in the final design stage or planned to be constructed in near future and which can be utilised by buses are as follows:- (See Map 9).

(i) The central road of Mikocheni - under construction

(ii) The central road of Kijitonyama - under construction

(iii) The central road of Sinza - under construction

(iv) The central roads of Tabata West - under construction

(v) Port Access Road from Ubungo (Morogoro Road) Via Pugu Road to Port-route alignment and design only done. Construction to start soon.

(vi) The roads from Tabata West to Pugu Road and Port Access Road - not done

(vii) The road from Manzese to Port Access Road - not done

(viii) The road from Manzese to Bagamoyo Road - under construction

(ix) The road Sinza - Manzese - Magomeni - not done.

Most of these roads are in site and service areas. With the construction of Port Access Road from Morogoro Road to Pugu Road to Port, and with the up-grading of the Magomeni - Kigogo - Pugu Road route, UDA should divert some of the town bound services from the CBD to these roads. It will then be easy for people e.g. residing in Sector A but wishing to travel to sectors C, D and E to go directly without passing through the CBD. The reverse is also true, i.e. people residing in sectors C, D and E can travel directly to sectors A and B without passing through CBD.

To-day, 15% of the traffic on the access (radial) roads is cross town traffic which will be moved from CBD when the Port Access Road between Morogoro Road and Pugu Road is built. This will reduce some of the traffic now using the two roads. It would also considerably reduce traffic on Bagamoyo Road as some of the vehicles would divert through Morocco Road and Kijitonyama Road to take the link roads from Morogoro Road to Pugu Road. In addition the Port Access Road will accommodate heavy lorries plying between the port and Ubungo warehousing area. Once these are prohibited from passing through city centre bus flow will be enhanced in CBD.

4:3:4 EXPRESS BUS ROUTES

The purpose of introducing express service is to eliminate intermediate stops. The new operational improvement should consist of peak hour express services linking the various peripheral districts to the centre of the city (CBD zone) where traffic and parking is to be restricted on a number of routes.

Accordingly, all the main bus routes should be served by express services during peak hours. In the mornings, express services should be for town-bound traffic only, from 7.00 a.m. - 8.30 a.m., while in the afternoons, 2.30 p.m. - 5.30 p.m., express services should be for outgoing trips. Since during peak periods passenger volume is high on roads, particularly at bus route terminals, it is recommended to engage the services of Ikarus models 280 and 266, buses because of their high capacity and other operational advantages. See section 2:6 and 2:6:1.

All town-bound express services should terminate at the Old Post Office terminus and organised in such a way as to allow only one intermediate stop at Kariakoo terminal, since a good number of workers are employed in this area.

Express services should operate only when passenger load available at a particular terminal area justifies quick ferrying. Otherwise another service should be introduced to supplement express services.

4:3:5 LIMITED STOP BUS SERVICE

These buses would stop and pick passengers ignored by express services. Once a bus has set off from the terminal, it should pick passengers at next bus stops until when it is loaded to capacity. From here it should stop only when there

are passengers disembarking. This service should not only operate during peak periods but also during normal periods.

4:3:6 PROVISION OF "SPECIAL" SERVICES TO MATCH SPECIFIC TYPE OF DEMAND

Special buses should be reserved for unscheduled private hire trips as demanded by various individuals and institutions. Presently, some factories in Dar-es-Salaam e.g. Tanita, Sungura textile, Pattex, Bora Shoes, Matsushita, Blanket Manufacturers, and Tanzania Textiles etc. have entered into contract agreement with UDA for the later to transport workers to and from work especially at night.

UDA should also allocate special buses to the Exhibition grounds and National Stadium whenever there are functions there. To make this service a success it is important for clients to give prior notice to UDA of their intention to hire such buses and give the management enough time (days) to assign drivers and buses for such special duties.

4:3:7 OPERATION OF MINI-BUSES

The present fleet of 50 mini-buses is inadequate to meet the needs, since less than a half of these are deployed everyday. UDA mini buses are performing an excellent job, an increase in their number is a sound decision. The only operational change the author proposes for mini buses is to allocate the services of some of those in areas where car ownership ratio is very high in the city and where maxi buses are normally running at half capacity or sometimes even less, either direction. Services to Oyster Bay area, Ocean Road Hospital, Kurasini and Mhimo la Udongo are cases in point. To make better fleet utilisation maxi buses should be removed from these areas and re-allocated on heavily congested routes.

4:3:8 STAGGERING WORKING AND SCHOOL HOURS

Government offices and some parastatals in Dar-es-Salaam start work at 7.30 a.m. and close at 2.30 p.m, primary and secondary schools also open at 7.30 a.m. but close earlier, at 1.30 p.m. The rest of the parastatals and private firms start work at 8.00 a.m. to 12.30 p.m. for lunch break, and from 2.00 p.m - 4.30 p.m. for the afternoon session.

An analysis of a normal day's trips performed in city buses, (Chapter 2 section 2:7:2) indicated that in the absence of staggered working and school hours at present an overwhelming number of trips were undertaken during morning (7.30 - 8.30 a.m.) and evening (2.30 - 5.30 p.m.) peak periods. The studies on passenger colume counts, chapter 2 section 2:7:3 has shown that bus traffic load on roads leading to work centres and schools - Pugu Road, Morogoro Road and Upanga Road - is significantly higher during the morning and afternoon peak hours as compared to preceding and succeeding hourly traffic volume. With the growth of city both in size and density, the peak hour transportation and traffic problems are bound to come more acute in years to come. Therefore a more efficient spreading of the travel loads is possible through the phasing of hours of school and work.

The device of staggering of working and school hours enables to spread out or disperse the peak hour work and school trips over a long period of time. This approach has the advantage of immediate implementation and providing quick relief to long hours spent on travel from home to work and back.

Since over 95% of the Secondary schools and about 50% of primary schools are located in CBD area it is possible for these to have different starting hours from Government and institutions. As a recommendation, Government offices and

parastatals should retain the existing working hours but schools should open at 8.45 a.m. Since school children are always in uniform it is easy to identify and bar them from boarding morning buses which are to serve workers only. Those contravening this regulation should be compelled to pay adult fare of shs 1/= instead of half fare cents =/50 they are charged now. The schools close at 1.30 p.m, one hour before time for closing offices. This time could be retained, but, instead of having half schooldays on Wednesdays and Saturdays these should be converted to full days to compensate the time lost due to starting classes late.

The suggested changes are likely to evoke opposition from some schoold (and parents) and individuals since it is likely to upset their habitual routine to which they have been accustomed. Therefore, attempts should be made to appraise the schools of the economic and social benefits of changing school hours. Considering the overrall interest of the city and the community as a whole and the expected relief to the road user and public transport system, it should not be too difficult to overcome the initial hesitation on the part of affected school children, teachers and parents to accept proposed changes.

In addition to above, transport problem could be eased if arrangement can be made to have primary school children schooling near home. Right now one finds some pupils from one zone of the city crossing all the way to other zones.

3:3:9 FREE TRANSPORT FACILITIES TO WORKERS

Parastatals and private companies could relieve the public transport problem in Dar-es-Salaam by providing free transport to their workers (or at a subsidized rate). Quite a good number of parastatals and private companies are doing this. The policy of encouraging employers to provide transport to their workers should be promoted further.

4:3:10 IMPROVEMENT AND CONSTRUCTION OF BUS LAY BYS, SHELTERS AND TERMINALS

The appearance of bus stops leaves much to be desired. The entire construction is not strong enough. The curbs at entrances and exits are not consistent with the turning characteristics of the buses. The result is that the buses overrun the curbs, damaging both curbs and tyres. Reconstruction of lay bys and shelters is urgently needed.

Kariakoo bus terminal needs special attention since at present there is no one central parking place, provided for city service buses. What is needed is a parking space for about 50 buses at one time, with clearly marked lanes, passenger footpath, separate platform for each route or group of routes, clear destination signs, time-table boards, room for despatchers, conductors, drivers and inspectors, advance ticket booking facilities (ticket kiosks) etc.

4:3:11 PUBLIC RELATIONS OFFICE

The activities of this office should be revitalised to pay a more promotional role. Its primary objective should be to keep the public informed of developments in the network and of changes occuring from time to time in all spheres of operations. This should be done by means of press conferences and printing and distribution of folders.

The importance of the Public Relations Office can be gauged by the fact that one of the main reasons for the

failure and abandonment of the "Short Route System" in May last year was the failure by UDA to inform the public on the new bus route network some weeks in advance by distributing leaflets, timetables, posters, etc. which could be displayed in buses, at the main bus stop shelters on the routes, at route terminuses and in some offices.

UDA's Traffic Department should maintain regular contacts with the local press and radio. Close contact should also be maintained with the Police - Traffic Section - in order to arrive at co-ordinated answers to traffic problems.

Footnotes:-

9. See 1975/76 Budget Speech by Minister for Finance, Government Printer, Dar es salaam, 1975.

10 See for example, "Urban Transport: Studies in Economic Policy" by M.E. Beesley, London, Butterworths & Co. (Publishers) Ltd, 1973, Chapter 10, pages 287 - 353, on Subsidies for Urban Transport.

11. During 1975/76 financial year the National Transport Corporation (NTC) acquired shs 15 million/= (shs 5 million/= from the Treasury in form of grant and shs 10 million/= as a loan from the Tanzania Investment Bank) for the construction of the Central Workshop. In addition, the Government is to give the NTC shs 5 million/= for construction of body building workshop for lorries and other vehicles.

12. See "Report on Public Transport System of the City, Dar-es-Salaam, prepared by a team of Hungarian experts sponsored by UNESCO, 24th, September, 1974 pages 6 - 7 (Unpublished paper).

CHAPTER 5

FUTURE OF PUBLIC TRANSPORT IN DAR-ES-SALAAM

5:1 SUMMARY AND CONCLUSION OF WHOLE STUDY

In order to solve successfully the urban transportation problems in Dar-es-Salaam as well as to achieve a planned urban growth, an efficient and economical means of mass transport needs to be fostered.

Dar-es-Salaam city is confronted with various kinds of traffic problems and particularly public transport and a drastic solution is urgent. For this it is necessary to go back to the basic question of how UDA should be managed and operated and how the limited traffic space can be most efficiently utilised.

The motor car is a convenient and flexible mode of transport with the advantage of privacy but it occupies much traffic space and its efficiency is low. Public transport on the other hand can carry far more passengers in relation to the space occupied and do so with less effort. Besides, a bus present fewer problems of safety and public risk.

In the foreseable future the Dar-es-Salaam metropolitan region will be dependent on both individual and mass transit. The liberty and comfort that the private car offers the individual and the family are so important that it is unconceivable that public transport will be able to eliminate it by competition. Conversely, as there is always a very substantial proportion of the population that is unable to drive or own a car, public transport will always be required.

In order to arrive at an urban transport system in which the accent is placed on public transport, it is vital not only to take such measures for improving transport efficiency, but also to consolidate public transport facilities, so that users may enjoy an easily accessible, more comfortable and convenient transport service.

In addition to introducing new routes and extending some of the existing ones, better utilisation of bus fleet and crew, greater dependability of bus service, change in fare structure through introduction of flat rate fare system and abolition of seasonal tickets, higher frequency and estimation of future size of bus fleet; a series of other measures such as (i) improve bus fleet maintenance (ii) training programmes (iii) new balanced distribution of depots and sub-depots and (iv) improvement of route and terminal facilities have also been suggested.

Measures other than those directly connected with UDA operations can also go a long way in improving the efficiency of services. Of these, (i) staggering of working and school hours into two different schedules instead of the existing one timing and (ii) wide application of traffic management measures as a means of ensuring a better system of traffic regulation and control. These measures should be advantageously utilised within the shortest possible time.

On giving public transport a firm place in urban transport, it should be planned to keep well in balance with the land utilisation plan as shown in the 20 - year Master Plan for Dar-es-Salaam.

One of the issues which has not been covered is how the urban structure could be evolved to lessen the demand in bus passenger trips given the increasing population and physical

expansion of the city. This is a long term problem and even the solution is also long term.

5:2 PROXIMITY OF WORK AND RESIDENCE

The satisfaction of public transport requirements can be achieved in part by urban design. The most important of such considerations is the desirability of locality workers and their work in close proximity. Various national institutions could build houses for their employees near their places of work. A few institutions e.g. The Friendship textile mill, Tanzania - Zambia Railway authority, the University of Dar-es-Salaam etc have already taken this step. Others should do the same.

There are two new industrial sites where new industries are being constructed - Ubungo and Kijitonyama. There is ample vacant land here suitable for residential development, and as such new firms in the area could provide accommodation to their employees in the proximity of workplace. Such considerations point to the advantages from city structures encompassing several secondary employment centres and a greater mix of work places and residences. Reduced average trip lengths, more balanced traffic flows and high densities along public transport corridors are among the potential benefits.

5:3 PUBLIC TRANSPORT PLANNING SHOULD BE AN INTEGRAL PART OF GENERAL URBAN PLANNING

In order to develop the bus system in step with the growth of the city, it is necessary that the transit planning is coordinated with the city planning. Many of the seemingly insoluble problems of urban transport in Dar-es-Salaam have been created by the insistence on treating each part of the transport network separately. The highway programmes failed to take into account the problem of parking, there are instances whereby there has been no relation between the design of roadway

and the operation of public transit vehicles. Development of new areas has been encouraged without provision of public transport service. For instance, people have persistently refused to move from Kariakoo to new site and service area of Tabata because there are no public transport services in the area, leave alone adequate access roads to the area. The lesson we learn from Tabata is that in order to encourage growth of population in a particular area, it is desirable to provide public transport. In other words, transit facilities should precede and guide population distribution rather than follow it.

A permanent body should be formed with representative from UDA, city authorities, Ministry of Lands, Housing and Urban Development, Ministry of Communications, Police, (Traffic Section) etc. to deal with overall transportation planning process in Dar-es-Salaam Region and particularly public transport. This body should take part in making decisions for transit operation and in working out the transit policy for the city. The prime objective of the transit system is to give the best possible service to the city's population and to be an instrument to promote development.

5:4 PHASED IMPLEMENTATION OF THE PROPOSALS

It is evident that Dar-es-Salaam city will continue to grow inspite of the fact that the capital city will move to Dodoma. The growth up to now has been about 10% per annum, and with this rate Dar-es-Salaam will approach about one million population by year 1980. However, the Master Plan assumes a growth of only 6% after 1974 which means that there will still be an annual increase in population of 30,000 people every year. An expansion of city in physical terms and population has to be directly correlated to expansion of bus services which must be done in the following steps:-

(i) The existing bus capacity can only be fully utilised by introducing new operational and management measures as recommended in Chapter 4.

(ii) The bus fleet should be extended with about 20 buses per annum to cover an increase in the population of 30,000 people per annum. A quick look at Table 15 on the projected fleet size reveals this. Nevertheless, it should be emphasised that it is only possible to execute step (ii) if step (i) is accomplished. Importation of a handful of foreign expatriate personnel to impart the know how to local people is inevitable in the immediate future if public transport industry is to progress in Dar-es-Salaam.

5:5 METHOD OF EVALUATION OF EFFECTIVENESS OF MEASURES

The measures to be taken to promote public transport are to be used in various combinations. The possibility of evaluation should be a feature of any of the above measures and the results can be analysed in terms of the following aspects:-

(i) Quality of service - the results most easily observed are those arising from improvements in road organisation (traffic management measures). Even so it is apparent that the quality of service offered by "new services" as recommended in Sections 4:3 - 4:3:9 will be much higher than that of the conventional system. The effectiveness of these measures are: time saving, regularity of service and comfort, high frequency, reduction in the number of delays and kilometres lost.

(ii) Financial resuls - reduction in operating costs, increase in revenue since a small proportion of

people who previously travelled by car or walked could use public transport. With high degree of reliability more bus trips can be taken even by present users.

5:6 ASPECTS OF [illegible] PUBLIC TRANSPORTATION PROBLEM THAT NEEDS FURTHER RESEARCH

This study attempted to break new ground by proposing various short and long term measures to promote public transport. A satisfactory dispersal of city population can be brought about leading to an integrated growth in all the spheres of metropolitan Dar-es-Salaam.

The author recommends that any further study of public transport system in Dar-es-Salaam should consider the following aspects not covered in this thesis:-

(1) Public transport service requirements should, in the final analysis, be determined by the needs and desires of the urban community in Dar-es-Salaam. A study of community requirements and desires should help us to indicate how best to build urban settlements that will minimise the need for movement as well as maximize the capacity to move.

(2) Another valuable subject for systematic research and analysis is the patterns of movements in the city centre. A more thorough understanding of the pattern of these movements and of the difficulties which they encounter is a prerequisite to seeking rational approaches to the problem of congestion in city centres and to the planning of urban area. Such a study can reveal specific points where pedestrian channelisation (the use of foot - paths in conjunction with guard rails or barriers so that pedestrians are kept off certain roads at certain locations), traffic lights, pedestrian crossings, restriction of right and left turning movements, one - way streets, closing side streets etc. could

be effected to promote public transport and general vehicular flow.

(3) Much of the success of public transportation planning depends upon the accuracy with which one is able to predict future trends in population distribution, employment levels, land use, income, and other underlying factors that influence travel demand. The result of such an analysis will benefit UDA, other organisations and individuals interested in the urban transportation planning field.

(4) A study on the development of new criteria for bus system operation, including improvement in scheduling and despatching at different times of the day, deserves more attention.

APPENDIX A

KENYA BUS SERVICES (LTD) EXPERIENCE

The main aim of this Chapter is to show how the Nairobi City Services, operated by Kenya Bus Services Limited (KBS) is functioning. It is more or less a comparative analysis between KBS and UDA but in selected fields of interest. UDA can learn a lot from KBS performance and experience since information obtained from the two companies clearly indicate that KBS is running well, while UDA is infested with management and operational problems which should be tackled along the lines recommended in the earlier chapters.

6:1 HISTORY OF KBS

Kenya Bus Services Ltd was incorporated as a private company on the 8th January, 1934, with an authorised capital of K£20,000 and was converted into a Public Company on the 9th June, 1950. Operations began with 13 buses on 12 routes, route miles were approximately 15 and the city's population was about 50,000 only - less than ⅓ of what it is today.

KBS is jointly owned by United Transport Overseas Ltd of London (which is a British Company operating or managing more than 100 companies in Europe, Africa, Australia, Canada, the Far East and South Pacific) with 75% shares and the Nairobi City Council holding the rest of the shares i.e. 25%. Negotiations are continuing with a view to the Nairobi City Council significantly increasing its shareholding to 49%. This will materialise before end of this year (1976).

Since the date of incorporation KBS has operated the public transport services in Nairobi under various franchises granted by the City Council. The current Franchise Agreement which commenced on the 1st January 1965 is for a period of

21 years, expiring on the 31st December 1985. Amongst other things, the franchise provides for presentation by the City Council on the Board of the Company.

6:2 ORGANISATION

The General Manager is the overall head of the Company. Below him there are four Departments with departmental heads: Traffic, Administration, Engineering and Accounts.

Unlike UDA, there is no shortage of manpower at all levels of the organisation. As at 23 April 1976, the Company employed a total of 1836 managerial, executive and other personnel of whom 99.7% were Kenya citizens. Out of 1,836 staff, all but seven are Africans.

Vehicle Operating (Drivers, Conductors, Inspectors)	1,225
Depot and Traffic	259
Vehicle Maintenance	258
Administration and Accounts	94
TOTAL	1,836

6:3 TRAINING

The importance of first-class training schemes and facilities has been fully recognised by KBS and a comprehensive programme of courses for drivers, conductors, inspectors and mechanics etc is provided at its Training School at Eastleigh, Nairobi.

A full time Training Manager with many years experience in Britain and elsewhere is employed who is responsible for the introduction, revision and extension of the various types and level of training and tuition provided. The most modern techniques and methods are used and courses are available for

training in every branch of the passenger transport industry. KBS training programme thus covers all levels of staff - technical, operational, management and accounting. KBS also assists employees who initiate their own private studies.

For the period 1970 - 1975 KBS has trained 14 people in the Traffic Department at middle and higher managerial level. All of these have diplomas in Road Transport and are members of the Royal Society of Arts (R.S.A.). Most of them have gone further, have studied and passed the C.I.T. (Chartered Institute of Transport) examinations and are members of the Institute. All supervisory and management staff in KBS are encouraged to become members of the C.I.T. Membership of C.I.T. is considered to be a high qualification by most Transport Industry employers. This is mainly because a high degree of Professional knowledge is required to become a full member. A good number of these 14 employees have also attended Management Development Courses at the Kenya Institute of Administration.

In the Engineering Department, during the same period 1970 - 1975, 19 workers sat for and passed the London City and Guilds examination, Motor Vehicle Mechanics Examinations and majority of these have enrolled for the Institute of Motor Industry Certificate examination. 15 other motor vehicle technicians and mechanics are undergoing training at the Kenya Polytechnic and at the National Industrial Vocational Training Centre for theoretical work and in KBS workshop for practical sessions. Four auto electricians and 6 body builders are also attending courses. All training expenses are met by the Company.

There are also sponsored students in Accounts Department studying professional qualifications. From time to time appropriate courses are available in United Kingdom for selected trainees particularly in management. These courses are either

(a) Attachment to Public Transport Companies or (b) Attendance at Management Development courses at Polytechnics.

6:4 BUS ROUTES

Like UDA routing system, KBS maintains a Long Route System with its operational advantages elaborated in Chapter 2 Section 2:3:1.

6:5 DISTRIBUTION OF BUSES AT DIFFERENT TIMES OF THE DAY AND WEEK

As at April 23, 1976 the Company owned 290 buses. Below is a fleet summary:-

Guy Victory "J"	113
Albion CD 23, 25, 27	123
Fiat 643E, 331A	54
TOTAL	290

NB: On order, for 1976 delivery: 20 Guy Victory "J".

Unlike UDA, KBS operates a 24 hour service because after midnight till 4.05 when dawn services begin, there are always 6 buses running to most residential areas in Nairobi e.g. Kariobangi, Eastlands, Kenyatta National Hospital, Kibera, Dangoretti.

Time and duty schedules for crew are divided into three groups - first, schedules for Mondays - Fridays whereby during morning and evening peaks 272 buses are dispatched, while during off-peak periods there are 160 buses running. During lunch

peak Mondays - Fridays 200 buses are out on routes. On Saturdays the company operates only 245 buses while on Sundays and Public holidays the number is further reduced to 150. This is because the demand for transport is less on Sundays and public holidays.

Table 1 below shows the growth of KBS operation.

TABLE 1: GROWTH OF KBS OPERATION

December cumulative	Total No of Buses	Total No. of passengers	Total No. of kms
1966	-	33,366,080	8,281,691
1967	-	38,401,061	10,322,457
1968	-	42,406,293	11,090,228
1969	-	44,656,039	11,342,189
1970	-	49,773,309	14,103,708
1971	198	61,539,465	14,348,721
1972	240	81,339,153	17,108,433
1973	264	88,496,656	19,008,212
1974	286	86,615,723	21,160,871
1975	290	83,989,143	22,529,859

From the above table it can be seen that the average number of passengers per bus is recording more or less a steady decline from 310,805 to 338,913, 335,214, 302,852, 289,617, in 1971, 1972, 1973, 1974 and 1975 respectively and is more pronounced during the latter years as compared to the earlier ones. Unlike UDA it is also very shocking to

find a constant decrease in number of passengers carried particularly from 1973 to 1975. This can be explained by the fierce competition KBS faces from Matatus and at same time it is due to constant increase in fares in August 1973, February 1974 (by 15%) and March 1975 (by 25%) whereby a small section of population has shifted from boarding KBS buses to Matatus since fares charged by KBS and Matatus are more or less at same level. Thus the decline is not attributed to inefficiency which is the case with UDA, but a resistance by customers or members of public to fare increase. On the other hand there is an increase in total kms operated per annum. Kilometres covered per bus drops from 72,168 in 1971 to 71,285 in 1972, but rises to 72,000 in 1973, 73,989 in 1974 and 77,689 in 1975.

6:6 OPERATING RATIO

The planned and actual number of buses dispatched on Saturdays, Sundays, Public holidays and at off-peak periods Mondays - Fridays and at lunch peaks i.e. the operating efficiency, is always 100%. For the morning and evening peaks, Mondays to Fridays, out of 290 buses held by KBS 272 buses are supposed to operate at this time. Tables II, III and IV shows that the total number of buses out in a day at peak period as a percentage of total KBS fleet has never gone below 90% in any day for the months of January, February and March 1976, while the opposite is true for UDA with below 50% in all days (see Section 3:4:4 and Table 30). This is because of high degree of competence of KBS workshop staff. This can be gauged by the adequate manpower in workshop (See Table V), regular supplies of spare parts, adequate depot facilities and relatively few breakdowns on any given month. KBS engineers are very experienced and they are backed up by a very competent and experienced team of mechanics. Engineering, technician and apprentice training is given a very high priority in KBS.

6:7 DEPOT FACILITIES, VEHICLE SERVICING AND MAINTENANCE

Area of depot is 2395.7m.^{2} Of this, structures and buildings or built up area is 5914m.^{2} 18043m^2 is for parking and movement area-access to pits, roadway to gates, access to fueling and washing place and parking. This balance of 18043m^2 is too small. To provide for future development of the company, KBS proposes to build sub-depots at Dandora near the far eastern boundary and at Dagoretti near the far western boundary of the city and negotiations have been concluded with the Nairobi City Council in respect to the former and are in hand in respect to the latter.

TABLE V :- KBS, MANPOWER POSITION IN ENGINEERING DEPARTMENT AS AT APRIL 1976

Skilled Workers

Chief Engineer	1
Assistant Engineers	6
Apprentice Master	1
Foremen	8
Draughtsman	1
Motor vehicle mechanics	65
Carpenters and Body Builders	11
Auto electricians	9
Panel beaters	1
Welders	5
Coach trimmers and cushion makers	2
Sign writers	1
Machinists in engine shop	1
Tachograph repairers	1
Ticket machine mechanics	4

Table V continued

Semi-skilled

Motor vehicle mechanics	12
Body builders	1
Auto electricians	6
Techograph repairers	1
Cushion makers	2
Painters	8
Greasers	8
Apprentices	30
Garage cleaners	6
Tyre fitters	10
Fuel and oil fillers	10
Bus cleaners	39

Stores

Stores superintendent	1
Stores supervisor	1
Stores clerks	6
Material cost clerk	1
Tyre records clerks	2
Counter issuer	1
Typist	1
Lorry driver	1
GRAND TOTAL	263

Tables II, III and IV shows cumulative figures on number of buses in KBS workshops waiting for repair. Compare this with Table 26 on the situation with UDA. The difference is very

striking. This is partly because the Management Agreement between KBS and United Transport Overseas Services Ltd (United Transport Overseas Limited wholly owned Management Company which has an office in Nairobi) provides KBS with the benefits of technical, management and financial expertise gained by United Transport Overseas Ltd through its world-wide transport activities. This Agreement also provides KBS with substantial benefits under UTO Ltd's local and international purchasing arrangements whereby UTO Group vehicles are purchased in bulky at cheap prices and there is a guarantee of spare parts.

Unlike UDA, KBS is buying and importing spares directly from manufacturers in Europe and elsewhere and not from agents in Nairobi, or Kenya for that matter. The exception is for items locally made for which the laws of the country do not allow such items to be imported. The readily availability of spares makes optimum utilisation of workshop staff.

6:8 ACCIDENTS

The number of accidents involving KBS buses are few indeed. For the months of January, February and March 1976 there were 53, 91 and 87 accidents respectively, implying that the daily average for the months of January, February and March is about 2, 3 and 3 accidents respectively. If we compare this data with Table 17 on UDA accidents we find that, on the average, there are more accidents involving KBS buses than UDA buses. This is mainly due to constant increase in number of vehicles in Nairobi and related congestion problems. The causes and nature of KBS accidents are similar to those of UDA. For the months of January, February and March 1976, 15 accidents (28%), 44 accidents (48.3%) and 44 accidents (50.5%) respectively involved KBS drivers with up to one year service in the Company. If we look at the fault, whether that of KBS driver or Third Party we find that of the total 231 cases for the three months, 21.2% of these were caused by KBS drivers, 38.2% Third Party and 40.6% of the cases are pending court decision.

When a KBS driver is involved in an accident or accused of careless driving, each case is examined carefully if it is substantiated that the driver is at fault he is disciplined or dismissed. Disciplinary action includes sending the driver concerned back to KBS training School for refresher courses.

In selecting drivers KBS selects only a relatively small proportion of the hundreds that apply. And once they have passed all their tests and been through the lengthy and comprehensive training, KBS drivers are considered by the transport industry to be the best trained in Kenya. The recruitment and driver-training programmes adopted by KBS are equal to those used by transport companies anywhere in the world.

6:9 INVOLUNTARY STOPS (BREAKDOWNS)

TABLE VI :- SUMMARY OF VEHICLE DEFECTS FOR THE MONTHS OF JANUARY, FEBRUARY AND MARCH 1976

Month	Engine	Transmission	Electrical	Suspension and Brakes	Tyres	Total
January	13	110	187	71	68	449
February	17	137	197	117	87	555
March	8	140	189	69	92	498

On the average, for the months of January, February and March 1976, there were 14, 19 and 16 breakdowns per day respectively, compared to daily average of 28 breakdowns in UDA (the lowest average recorded figures). This can be explained by good workmanship in workshop, good road conditions

in Nairobi and high degree of competence of KBS drivers. Table VII below on km. lost due to involuntary stops exemplies this.

TABLE VII :- Km. LOST DUE TO INVOLUNTARY STOPS

1975 and 1976

Year 1975	
Month	
January	16,787
February	10,921
March	14,443
April	9,961
May	9,340
June	9,479
July	8,875
August	7,952
September	12,241
October	12,563
November	12,995
December	12,912
1976	
January	12,305
February	18,684
March	18,912

The number of km. loset due to involuntary stops is increasing from one month to another. To solve this problem the Company has drawn up a programme for all drivers to come back to its training school for refresher courses.

6:10 CREW PUNCTUALITY AND DISCIPLINE

The author also made a study of crew punctuality in KBS similar to one made in UDA.

TABLE VIII :- CONDUCTORS' DAILY STAFF RETURN - MARCH 1976

	Absent	Sick	Light Duty	Suspended
	424	638	87	51
Daily Average	14	21	3	2

DRIVERS' DAILY STAFF RETURN - MARCH 1976

	Absent	Sick	Suspended
	492	589	143
Daily Average	16	19	5

Any driver or conductor who reports for morning duty after 6.30 a.m. is regarded as absent and is not allocated any work on that day. The penalty is deduction of employees one day's wage. Those who report late at or before 6.30 a.m.

are allowed to work but are charged for being late. Any case of late coming for more than 20 minutes after the time one is scheduled to report for duty is charged, whereby a Complaint sheet is given to crew member and he is supposed to state why he is late. If the explanation is not satisfactory he is deducted from his salary the number of minutes he has been late.

TABLE IX :- MONTHLY CASES

Nature of Case	NUMBER		
	January	February	March
Reporting late for duty over 20 minutes	34	35	20
Failing to complete duty, to operate as scheduled, to resume duty	74	67	69
Operating a bus without authority, without a conductor, failing to stop at a bus stop	17	11	8
Stealing and failing to collect fare money from passengers, Failing to enter correct amount in way bill	59	72	80
Others (e.g. failing to wear full uniform)	6	9	71

Note:- The Company employs 608 drivers and 694 conductors as at 23rd April, 1976.

The action taken against such cases is either issuing warnings and or probation, the driver looses Safe Driving Award benefit, or deduction from his daily wage on minutes not worked.

Cases of stealing and or failing to collect fare money from passengers are very common among KBS conductors than UDA's. Most of theft cases by UDA conductors are connected with the opening of ticket machines and backdating the numbers showing total fare collected.

6:11 INCENTIVE WAGE (BONUS SYSTEM)

KBS has formulated a procedure under which drivers and conductors are entitled to bonus wage. There is no bonus payment in workshop except under conditions stated below. The bonus wage is geared towards improving the task performance of conductors and drivers resulting in greater revenue collection and better handling of buses. The bonus system in Traffic Department is effected in the following way:-

(a) Bonus scheme for drivers (i) Safe Driving Award (SDA) - is given to drivers with very clean records in a month, without accidents or overspeeding. Tachographs (which records speed, time, distance operated, time when bus is idle and in motion etc) are fixed in buses and the charts are removed in the evenings. A driver with a clean record in a day is entitled to shs 1/= each day. If a driver commits other offence (s) connected with driving other than accidents or over-speeding he is not entitled to SDA on that day. Drivers with a clean record for each day in the whole month are entitled to shs 35/=. There are no tachographs in UDA buses and due to lack of this device, UDA drivers have made it their habit to overspeed without fear of sanction.

(ii) Special incentive award for drivers - those drivers who qualify for shs 35/= SDA as mentioned above also also qualify for a special award. A draw is made, out of those entitled to special incentive award ten names are picked out of the draw and each of the ten is entitled to shs 200/= a month. For the month of February 1976, 118 drivers each received 35/= as SDA, out of these only 10 were further presented with shs 200/= each as special incentive award.

(iii) Special Driving Award - is given once a year to the following groups of drivers : (a) P.S.V. route drivers - all those who work on routes. The driver with the cleanest record in the Company for a whole year gets shs 600/=, the second shs 300/= and the third shs 200/= (b) Drivers on contract hire service - best driver gets shs 300/=, second best shs 200/= and third shs 100/=

(b) Bonus scheme for conductors

The best conductors in the Company are appointed as Special Duty Conductors. Currently their number is 155. Sepecial Duty Conductors (SDC) are the only conductors entitled to bonus system. They are picked from normal route conductors. SDC are not assigned to any shift but are scheduled to work on particular routes during morning, lunch and evening peak periods and are given minimum target fare collections each day. The targets are uniform for all routes because passenger congestion is found on all routes during peak periods. Currently, the minimum fare target is shs 430/= per day. Collections above the target serves as a basis for bonus payment.

Minimum revenue per day worked — Shs 430/=

Bonuses

80 Hours Overtime	13,000/=	-	13,999/=
90 Hours Overtime	14,000/=	-	14,999/=
100 Hours Overtime	15,000/=	-	15,999/=
110 Hours Overtime	16,000/=	-	16,999/=
120 Hours Overtime	17,000/=	-	17,999/=
130 Hours Overtime	18,000/=	-	18,999/=
140 Hours Overtime	19,000/=	-	19,999/=
180 Hours Overtime	20,000/=	-	20,999/=
200 Hours Overtime	21,000/=	-	21,999/=
210 Hours Overtime	22,000/=	-	22,999/=
220 Hours Overtime	23,000/=	-	23,999/=
230 Hours Overtime	24,000/=	-	24,999/=
240 Hours Overtime	25,000/=	-	25,999/=

Should a SDC fail, without adequate reason to bring in the minimum revenue required, i.e. shs 430/= per day worked, he is returned to the Route Conductors Roster. Normally all SDC reach the minimum fare target with a few going above 120 hours overtime. There has been only one case beyond 210 hours overtime. The basic minimum required to be allowed to remain as a SDC is shs 12,825/= per month. To get this, a SDC has a guaranteed overtime of 90 hours a month apart from normal hours. On hourly basis, the normal working hours in a month is 195 hours plus 90 hours overtime - 285 hours a month. Every hour the average a SDC should bring is shs 45/=. For every 1/= that SDC falls below the average minimum per hour, he forfeits 3 hours overtime claim in addition to his losing SDC and going back to the routes.

For the months of February and March 1976 what was paid to SDC (costs) expressed as a percentage of revenue brought by them is 10% and 9.85% respectively. In other words, this incentive scheme is bringing very substantial net revenue to the Company. On the other hand, hard working SDC earn more than shs 1500/= per month, with some even 2000/= when their salaries which is either shs 601/= or 613/= a month depending on years of experience, and bonus wages are combined. Normal route conductors who reach the above targets are promoted or assigned as SDC. So even the route conductors have incentive to work hard so that they are made SDC.

(c) Special bonus scheme covering drivers, conductors, mechanics etc.

(i) Public holidays - all drivers, conductors and mechanis who work on public holidays are regarded as working on overtime basis and are entitled to overtime payment for all hours worked. The rate of payment is 1½ times the normal hourly wage rate. The basis of this is that any work beyond 45 hours a week is entitled to overtime payment. This is also another incentive wage. When preparing rota for crew to work on public holidays care is taken to ensure that all drivers, mechanics and conductors have equal chances of working during public holidays.

(ii) 20 years of service - this has nothing to do with productivity, but every member of Company from top management to bottom of scale, who, in recognition of long service, is entitled shs 1000/= after working with KBS for 20 years.

6:12 PERMANENT COMMITTEE DEALING WITH OVERALL TRAFFIC PROBLEMS IN NAIROBI

Unlike in Dar-es-Salaam city, the day to day and overall

traffic problems in Nairobi are dealt with by a special committee whereby KBS is also represented.

Any development going on in Nairobi that can affect public transport is advised to KBS by Nairobi City Council, so that KBS plans are related to development of the town. In new housing estates eg. Buruburu, Huruma and Dandora, the Nairobi City Council advises KBS in advance by giving the later information and plans on location of estate, units to be constructed, planned population, income group that will be living there etc. The Council has given KBS such plans covering a period up to year 1980. Even road plans are also submitted to KBS so that the Company can suggest where it would like to have a bus lay-by and bus terminal.

When it comes to day-to-day traffic problems, there is a committee in the Nairobi City Council - Traffic and Road Safety Committee composed of representatives from the Council, KBS (only the Executive Assistant Traffic, or Traffic Manager do attend), Police, Provincial Commissioner for Nairobi, Automobile Association of East Africa, Institute of Advanced Motorists, and Insurance Association of East Africa. These discuss the day-to-day traffic problems in Nairobi and find solutions. Meetings are held once a month.

6:13 LESSONS TO UDA

UDA can learn many lessons from KBS such as:-

(a) The success of UDA will depend on the orientation of its training programme. There is an urgent need for UDA to recruit a full time training officer with many years of experience to be responsible for the introduction, revision, and extension of the various types and levels of training and tuition provided.

(b) There is an urgent need of training young men for

operative and administrative posts to obtain in - depth knowledge of working procedure. The subjects should include conducting, inspecting, scheduling, route planning, timetables etc. Futhermore, employees should be encouraged to study R.S.A. diploma courses in Transport. All supervisory and management staff should be encouraged to become Members of C.I.T. Management training needs to be re-assessed and up-dated. Refresher training should be given to all categories of road staff as and when is required. This should include drivers, conductors, inspectors and time keepers.

(c) Engineering training should be given a very high priority in UDA. Technician training should aim at improving the supervisory level in the Company workshops. Particularly apprentice training should be promoted. Apprentices should be given practical on-the-job training covering all aspects of the work in the workshops and during these practical sessions, trainees should be given more responsible work in assisting with supervision. Having more vehicles is not a solution to urban public transport problems. UDA with a fleet of 374 buses harly deploys half of it in any day, while KBS with a fleet of only 290 buses always deploys over 90% of this every day. The ratio between the average number of vehicles in daily service and the total number of vehicles held in the fleet (which is an indication of the state of serviceability and efficiency of maintenance) is

$\frac{1}{2}$: 1 for UDA and

$\frac{9}{10}$: 1 for KBS.

(d) KBS buses are more reliable than UDA's in terms of timely departure from as well as arrival at terminals and also passing through intermediate stops at right

time. KBS buses are normally able to cope up with time schedules because of the strict disciplinary measures the Company is imposing on crew. At same time there is very strict supervision of crew by Inspectors. The incentive wage system enforced in KBS makes the crew to have a sense of responsibility for fear of financial sanction. Tachographs should be fixed in UDA buses to enable the Company to assess daily crew performance and penalise the offending ones.

APPENDIX B

TRENDS IN MASS TRANSPORTATION DEMAND

Year	Month	Number of Buses	Passengers Carried	Average No. of Passengers Carried per day	Monthly receipts in Shs	Total route length covered in miles	Average daily effective distance operated	Mileage lost due to involuntary stops
1970	Jan	114	4,561,904	147,158	-	485,748	15,699	
	Feb	114	4,368,286	156,010	-	461,367	16,477	
	March	114	4,910,233	158,394	1,775,840	515,492	16,628	
	April	114	4,689,418	156,313	1,691,040	482,140	16,071	
	May	114	5,001,434	161,336	1,779,580	489,119	15,778	
	June	114	4,808,397	160,279	1,733,460	482,101	16,070	
	July	114	5,054,071	163,034	1,850,140	507,112	16,358	
	August	114	5,111,267	164,879	1,861,600	-	-	

1970	Sept	118	4,867,837	162,261	1,759,360	496,574	16,552
	Oct	123	5,147,457	166,047	1,888,440	528,651	17,053
	Nov	123	5,147,457	171,581	1,948,000	520,295	17,343
	Dec	127	5,527,567	178,308	2,000,960	529,109	17,060
	TOTAL		59,379,624	162,683	18,288,420	6,008,377	16,461
1971	Jan	127	5,558,791	179,315	2,032,880	528,327	17,042
	Feb	129	5,352,293	191,153	1,921,360	493,207	17,614
	March	132	5,784,251	186,588	2,056,740	553,493	17,532
	April	134	5,547,483	184,916	1,968,080	513,025	17,100
	May	137	5,651,685	182,312	2,034,360	526,846	16,995
	June	138	5,558,075	185,269	1,989,320	523,567	17,452
	July	139	5,797,486	187,015	2,080,360	529,888	17,093
	August	140	5,849,094	188,680	2,093,040	551,232	17,781
	Sept	142	5,795,885	193,196	2,081,600	553,722	18,457
	Oct	146	6,222,320	200,720	2,221,560	580,927	18,739
	Nov	149	5,851,333	195,044	2,092,100	523,343	17,444
	Dec	149	5,918,291	190,912	2,149,340	826,043	26,646
	TOTAL		68,886,987	188,731	24,720,740	6,693,629	18,338

1972	Jan	148	6,530,401	210,658	2,290,920
	Feb	152	6,147,313	2219,546	2,143,730
	March	156	6,321,081	203,905	2,326,210
	April	159	6,159,483	205,316	2,252,800
	May	169	6,611,686	213,280	2,357,880
	June	169	6,866,577	228,885	2,370,200
	July	175	6,725,092	216,938	2,448,140
	August	180	5,783,074	186,550	2,529,539
	Sept	191	6,773,711	225,790	2,441,892
	Oct	191	7,085,510	228,564	2,573,150
	Nov	191	6,938,861	231,295	2,500,242
	Dec	199	7,085,753	228,572	2,624,793
	TOTAL		79,028,542	216,516	28,859,496
1973	Jan	202	6,617,025	213,452	2,429,657
	Feb	204	6,361,431	227,193	2,334,127
	March	204	7,071,229	228,104	2,609,899
	April	206	6,775,373	225,845	2,538,042

912,393	29,432
884,578	31,592
940,463	30,337
941,541	31,384
946,043	30,517
981,779	32,725
984,653	31,763
1,027,859	33,156
996,140	33,204
1,006,408	32,464
984,392	32,813
1,003,148	32,359
11,348,913	31,092
955,291	30,815
902,546	32,233
988,615	31,890
956,870	31,895

1973	May	208	6,767,860	218,318	2,525,420
	June	206	6,847,793	228,259	2,546,483
	July	206	6,976,592	225,051	2,606,313
	August	207	6,907,368	222,818	2,551,272
	Sept	207	6,578,362	219,278	2,437,194
	Oct	207	6,821,781	220,057	2,540,864
	Nov	217	6,377,258	205,718	2,333,650
	Dec	216	7,112,632	229,439	2,624,993
	TOTAL		81,214,704	222,506	30,077,914
1974	Jan		6,177,548	199,275	2,744,616
	Feb		5,475,350	195,548	2,606,425
	March		6,127,947	197,675	2,911,112
	April		5,496,006	183,200	2,676,822
	May		5,496,006	190,791	2,923,992
	June		5,691,558	189,718	3,308,907
	July		5,951,046	191,967	3,227,634

947,957	30,579	
971,861	32,395	
1,012,419	32,658	
991,980	31,999	
917,955	30,598	
947,781	30,573	
876,583	29,219	
965,629	31,149	
11,435,491	31,330	
896,989	28,935	554,245
817,449	29,194	544,383
906,240	29,233	658,720
860,122	871,636	
893,542	28,823	692,438
850,930	28,364	592,273
895,246	28,878	515,178

1974	August	6,396,871	206,350	3,264,228	937,866	30,253	497,625
	Sept	7,343,796	244,793	4,088,807	963,762	31,089	450,255
	Oct	8,099,875	261,285	4,551,160	1,044,387	33,689	489,823
	Nov	8,716,016	290,533	5,008,677	1,016,048	33,868	487,838
	Dec	9,421,810	303,929	5,357,128	1,010,714	32,603	543,511
	TOTAL	80,812,398	221,403	42,669,508	10,274,295	363,599	6,897,925
1975	Jan	8,438,842	-	-	910,552	29,372	616,047
	Feb	7,593,011	-	-	824,697	29,453	588,377
	March	9,173,324	-	-	936,475	30,208	1,470,549
	April	8,371,002	-	-	922,036	30,734	-
	May	8,850,041	-	-	896,477	28,918	-
	June	8,888,675	-	-	-	-	-
	July	8,666,248					

Source: UDA, Traffic Department

Notes— (1) Mileage for 1974 and 1975 does not include private hire of buses

(2) Data on passengers carried does not include seasonal tickets

(3) Mini buses are excluded from this data

(4) Ikarus buses started operating on 1/3/75. However, 34 of these brand new buses remained idle in workshop until end of year due to inadequate repair facilities. The buses were put on road when Ubungo depot for Ikarus buses only was opened late last year.

APPENDIX C

The following courses were being undertaken by employees in different departments of the Company at the time when the study was made either in the country or abroad.

(a) Engineering Department - 2 assistant engineers were attending a 9 months course in Britain. 4 mechanics were undergoing a 3 year course in engineering in Hungary. The Company was to sponsor 3 mechanics in 1975/76 academic year for a diploma course in engineering at the Dar-es-Salaam Technical College. More technicians are being trained for Trade Tests Grade III, II and I in Dar-es-Salaam. The Company is meeting all the expenses. Supervisory courses for foremen in the Engineering Department are going on in Dar-es-Salaam. The courses include individual, group and workshop exercises as well as take home assignments. With the opening of the National Institute of Transport (School of Motor Vehicle Mechanics) the Company is planning to send more students (for diploma course in motor vehicle mechanics) every year.

(b) Traffic Department - there are very inadequate training facilities in Tanzania for training of personnel in this department. Since the nationalisation of the Company in April 1970 the Nairobi - based Kenya Bus Services Ltd has always refused to accept any candidate from UDA to study at their well organised institute in Nairobi. The Department is conducting theoretical and practical classes for drivers and conductors at the Company premises. What is important here is to review the content of the course so as to improve the quality of the programme.

The Company should also improve the standard and competence of instructors in this course, leave alone organising refresher courses for drivers, conductors and even mechanics who cause most of the accidents within depot areas.

The Department is yearly expected to sponsor some employees to the National Institute of Transport (School of Transport Management) for a diploma course in transport management. At same time plans are underway to organise refresher courses for inspectors, despatchers and other sectional heads in the department.

(c) Accounts Department - in an effort to promote professionalism in the department the following training programmes are being undertaken. One employee is in Britain for a 3 year advanced course in A.C.C.A. Two more employees are attending an accountancy course (C.P.A) at the Institute of Finance Management in Dar-es-Salaam. Plans are underway to sponsor workers in this Department for advanced courses in CPA and ACCA during the period 1975 - 1980 to attain self sufficiency in terms of Accountants and Auditors by the end of Plan period. Accounts Assistants are also given advanced training in Book-keeping, Accounting, Principles of Accounts, Commercial Arithmetic etc organised by various institutions. The Company meets some of the costs.

APPENDIX D

DAILY ALLOCATION OF INSPECTORS BY ZONE

ZONE I	Number		ZONE II	Number		ZONE III	Number	
	AM	PM		AM	PM		AM	PM
Muhimbili Hosp.	1	1	Kariakoo–Kimamba	1	-	Pugu–Ukonga	1	1
Kariakoo–Ferry	1	-	Magomeni–Kindoa	1	1	Tom–Ukonga	1	1
Kinondoni	1	-	Manzese–Mapipa	1	-	Tandika	1	1
Mwananyamala	1	1	Ubungo–University	1	1	Temeke	1	-
Oyster Bay–Msasani	1	1	Kimara–Mbezi	1	1	Mtoni–Keko	1	-
Mikocheni–Mwenge	1	-	Mbezi–Kiluvya	1	1	Kurasini	1	-
Kawe	1	1	Kigogo	1	1	Mbagala–Kingowe	1	1
Africana–Bahari Beach	1	1	Buguruni	1	1			
Lugalo–Bunju	1	1						

Note:– Shifts

A.M. – 5 a.m – 12.30 p.m.

5.30 a.m. – 1.00 p.m.

6.00 a.m. – 2.30 p.m.

P.M. – 12.30 p.m. – 8.00 p.m.

1.00 p.m. – 8.30 p.m.

1.30 p.m. – 9.00 p.m.

(i) For the 4.30 p.m. – 12.00 midnight shift there is only one inspector.

(ii) For the 7.00 p.m. – 2.30 a.m. shift there is also one inspector.

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PLATE 1 :- Long queue of city workers waiting for buses along Kigogo Road in the morning. The arrival of bus is often not the end of the ordeal because it is already full with people who have boarded it at earlier bus stops in order to be taken to city along the same route again. An UDA ticket examiner is seen inspecting the tickets which the people have bought before the arrival of the bus.

PLATE 2 :- Flooded road – Airport road. Several vehicles are stuck as they battle their way to and from the airport.

PLATE 3

Because of shortage of buses in any day, overloading and overcrowding is the order of the day particularly during peak periods. This results in higher wear and tear and other operating costs, extra delay and inconvenience to passengers as well as to running staff.

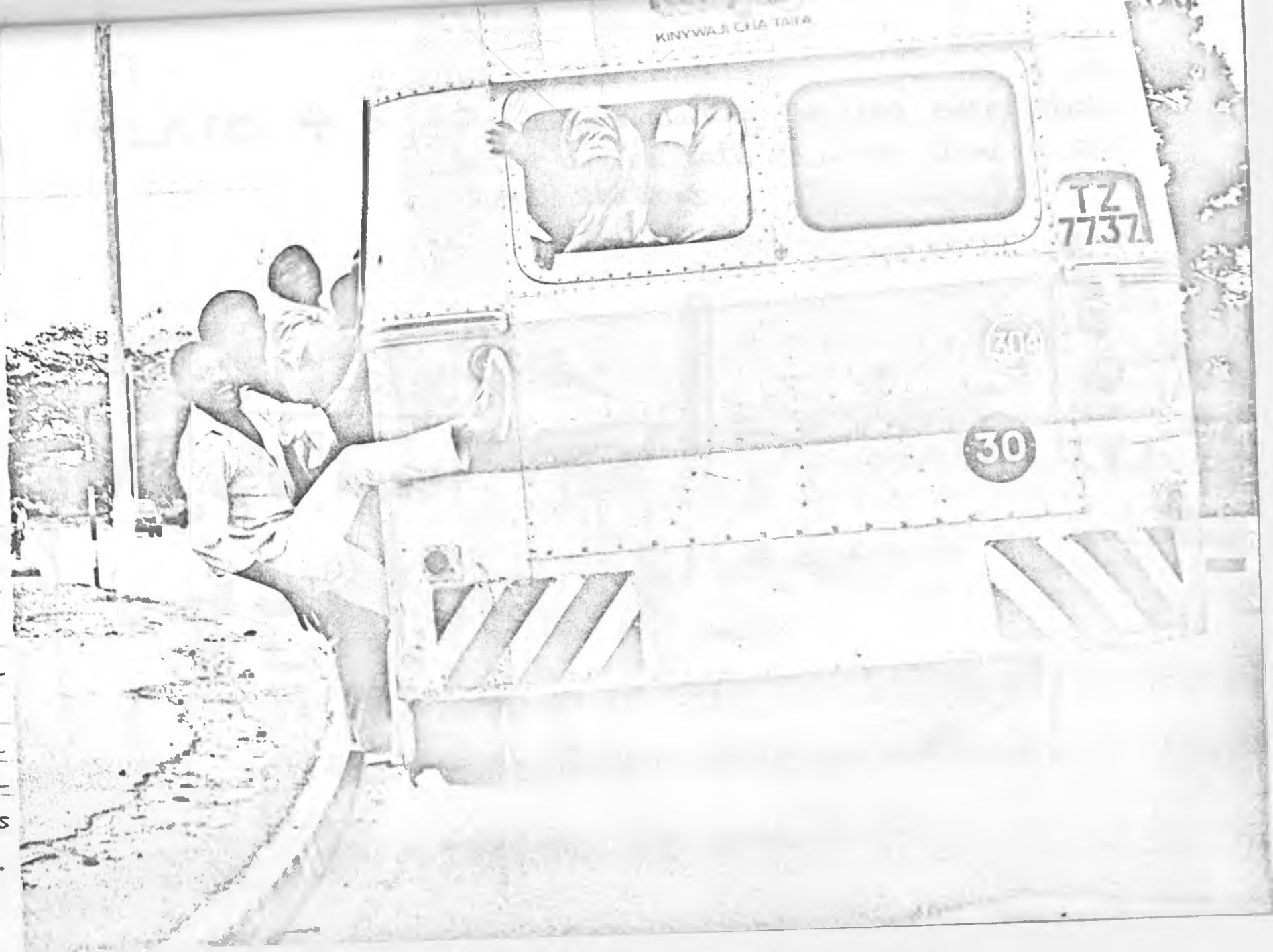

PLATE 4 :- Passengers waiting for UDA buses which either arrive late or never show up at some stations.

PLATE 5 :- Mix of fast vehicles with slow vehicles, bicycles and pedestrians.

MAP 9 DAR ES

FROM BAG

REGION PLANNNING PR

LEGEND

MAJN ROAD

RAILWAY

RESIDENTIAL DISTRICT

RIVERS

CLIFFS SAND REEFS

KARIAKOO BUS TERMINAL

BUS STATION

OLD POST OFFICE TERMINA

UDA KURASINI (MAIN) DEPOT

UDA UBUNGO DEPOT