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Urban road transport performance and challenges in Sub-Saharan millionaire cities: Case of the Douala IV municipality in Cameroon

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Abstract
Unorthodox and anarchical use of urban road transport ruffles performance. This article probes into the fundamental challenges of urban road transport in Douala 4 with the hope to introduce salvage solutions to the anarchy accrued. The paper posits that inadequate road infrastructure, anarchical use of roads and socio-economic drawbacks has triggered poor performance of road transport in Douala 4. Some 238 questionnaires were administered to households and other road users in the Douala 4 municipality to capture first hand data from the field. Interview sessions, focus group discussions and field observation were done to collect data on the mundus-operandi of road transport in the area and its effect on performance. An in-depth documentary research was done to match-up the data collected from the field with existing research in order to have a good analyses for results. Results from findings propound that mobility in the municipality is dominated by private transport while collective transport is by commercial motorbikes. The performance of road transport is hampered by inadequate roads sizes (42.8%), limited parking lots (26.5) inefficient mass urban transport (16.5%), and poor state of vehicles (14.2%). This has provoked unadorned traffic congestion from poorly managed road circulation which produces exhaustible delays and delivery time. This is caused by limited road intersections, lawless roadside parking, non-respect of traffic control lights, unwanted road accidents as well as rebellious circulation of heavy duty vehicles which leaves much to be desired. This article endorses that the road sizes should be revised and road intersections, roundabouts and parking spaces should be properly managed. Circulation of motorbike and mini-transport buses should be regulated to limit anarchy at best. Stringent rules and sanctions on any defaulters to circulation norms must be meted in order to improve on the performance of road transport in Douala 4 and beyond.

Keywords: urban road transport, performance, challenges, anarchy, congestion, control, Douala 4.

1. INTRODUCTION

Road transport performance designates the efficiency of the road to move passengers, goods and services as well as the state of road infrastructure (Rodrigue, 2020). The performance of urban road transport is generally determined by the state of road transport infrastructure and the degree of traffic congestion. Urban road transport mishaps can either make or mar performance. The key characteristics of a well performing urban road transport system are affordability, safety, and reasonable journey, quality of services, environment, satisfactory working conditions and appropriate institutions to ensure sustainability (World Bank, 2018). Once such characteristics begin to dwindle in any road transport system, the performance becomes questionable.

African cities mostly rely on road transport systems as it handles over 80% of the movement of goods and services within the continent. The overdependence on road transport is made manifest in the Douala metropolis with a road transport dominance in the movement of goods and services. Douala being the economic hub of Cameroon has witnessed a rapid growth in its population which has attracted several investment bodies for trade (World Bank, 2018). Such trade links might adequately function well with good and accessible road infrastructure. This unfortunately is not the case as the urban road infrastructure in the Douala metropolis leaves much to be desired. The effects of an inadequate road infrastructure are observed in the Douala 4 municipality which plays host to the largest industrial zone in Douala and Cameroon. One would have loved to observe that the gateway of transit for three regions in Cameroon which are North West, South West and the West regions will have a good road transport network. Unfortunately, such is not the case with the Douala 4 municipality as the urban road transport has become a call for concern. Circulation of goods and services within and out of the municipality is faced with incessant traffic congestion and delivery time triggered by inadequate infrastructure and poor conditions of roads. It is in furtherance of these issues that this article seeks to examine the performance and challenges of urban road transport to the Douala 4 municipality with the hope to propose cubing strategies.

2. LITERATURE REVIEW

Several authors have advanced research and ideas on road transport infrastructure in Cameroon and beyond. This article reviews their opinions and makes a difference between their advances and what can be considered new. The mobility (transportation of people and materials) is one of

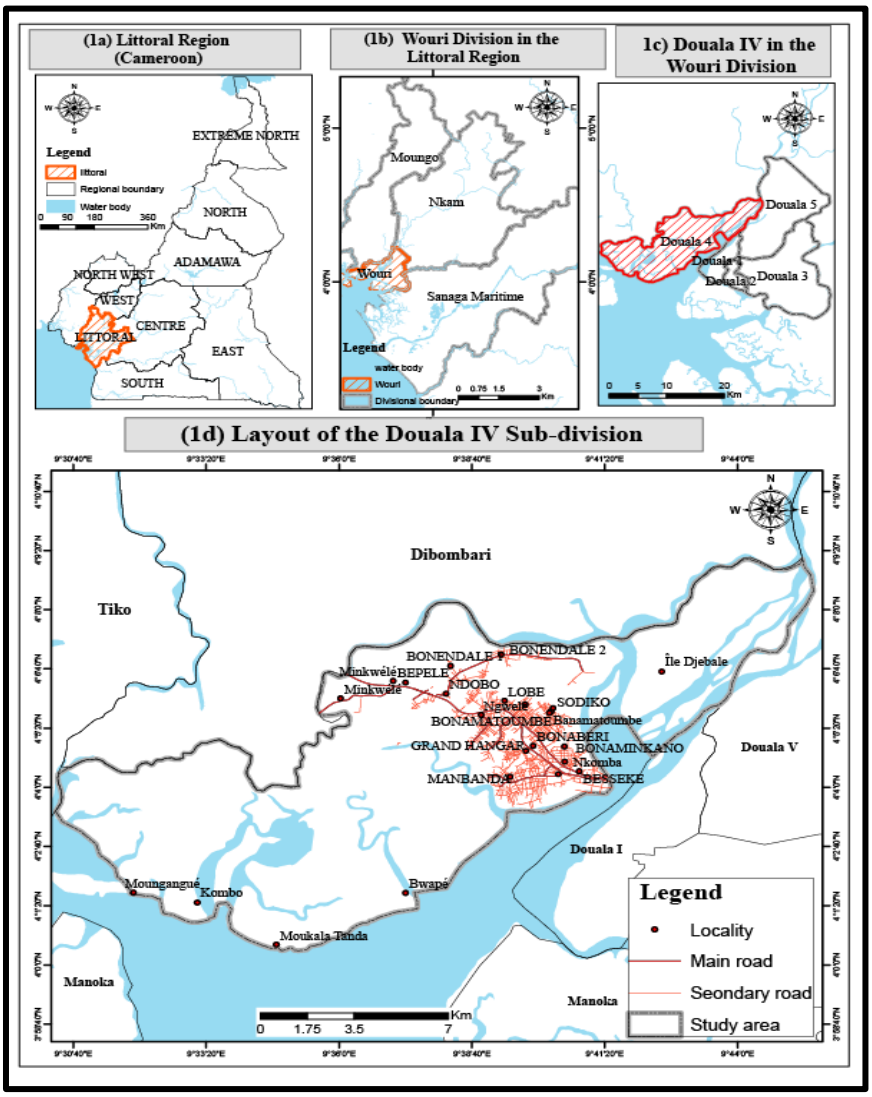
the greatest need that have to be sufficiently satisfied in any society if any meaningful level of social interaction, co-operation, production activity, economic and other types of development and the enrichment of human welfare is to be achieved. This is the reason why road transport is generally referred to as the engine and wheel of the society (Njatcho, 2022). The author reveals that road transport infrastructure plays an important role in the exchange and the process of economic transformation and sources of economic integration through increase flow between countries. The movement of goods and services in an area has to be sustainable. This falls in line with the work of (SYSTRA, 2019) that focuses on operations that take place using movements. The author stresses that the availability and accessibility of transport infrastructure plays a tremendous role ensuring growth and development which makes it very vital not only in commerce but generally in the day to day life of people.

It is worth noting that for a traffic system to be performant, certain strict management rules and innovations have to be put in place (Prasanna et al, 2020). This will improve on circulation and reduce congestion at best. This is supposed to be the case in Douala, the economic hub of Cameroon which harbors national and international movements. Unfortunately, such is not the case as several factors are responsible for the wanton traffic delays in Douala (Forgha & Mbohjim, 2013). The delays either emanate from the inadequate road infrastructure, to limited size an anarchical occupation of roads by street vendors which renders circulation impracticable. Other modes of transport such as rail, water and air transport which could serve as decongestion means to circulation are not properly controlled and managed, leading to slow delivery time (Gnap et al, 2021). One major hindrance to road transport performance in Cameroonian cities in general and Douala in particular is the introduction of motorbike transport which breeds much anarchy (Fogwe, 2020). The urban road transport performance of the Douala 4 municipality is being affected by several factors to which motorbike circulation stands as the dominant hindrance. This paper therefore x-rays the difficulties accrued in the urban road transport sector in Douala 4 and attempts curbing strategies to the situation to render it performant.

3. MATERIALS AND METHOD

The Douala 4 municipality is located between latitude 4°4’0’’ to 4°6’0’’North and longitude 9°37’10” to 4°39’20’’East of the Greenwich Meridian. It is found in the coastal region of Cameroon and occupies a surface area of 2630 ha (26.3 km²), with a population of 352,275 inhabitants (BUCREP, 2005 and 2010 projections). Douala 4 is bounded to the East by Douala 5,

to the South by Douala 1, to the North by Dibombari and to the West by the Tiko town. Traffic flow in this locality is very tense due to the presence of industrial and port activities that pull in many people and freight transportation in this part of Douala (Figure 1).



Source: Modified from National Institute of Cartography by TIH, 2022

Figure 1: Location of the Douala 4 municipality in Cameroon

Data collection was done through primary and secondary sources for a qualitative and quantitative research. In the primary data collection, some 238 questionnaires were administered to household and other road users in the Douala 4 municipality to capture first hand data from the field. This was drawn from 52614 total numbers of household in the Douala 4 municipality following the 2005 population census data and 2010 projections of Cameroon (BUCREP, 2005

and 2010 projections). Since it was not possible to sample this total, a 0.5% of the households was chosen as sample size (Oloyo, 2001) to arrive at 238 (Table 1).

Table 1: Household sampling in the Douala 4 municipality

N	Neighbourhoods	Clusters	Household	Total HH/ cluster	0.5% sample	Total sample size	Eff. Resp	Total Eff. Resp	% of eff. Resp
1	Bojongo	NW cluster	1155	7615	10		10	37	80
2	Ngwelle		6460		30	40	27		90
3	Djabale 1	North Eastern cluster	54	4862	3		3		100
4	Djabale 2		11		3		3		100
5	Ndobo		3817		12		10		83.3
6	Bonendale 1		123		5	38	5	36	100
7	Bonendale 2		343		7		7		100
8	Bonendale 2		514		8		8		100
9	Grand Hangar	South Western cluster	3230	21126	12		10		83.3
10	Mabanda		13736		70	97	60	83	61.8
11	Nkomba		4160		15		13		86.7
12	Bonassama	South Eastern Cluster	1186	19011	10		8		80
13	Beseke		1475		10		8		80
14	Bilingue		3738		12	94	10		83.3
15	Bonambape		3161		12		10		83.3
16	Sodiko village		40		3		3	82	100
17	Sodiko ville		2811		12		10		83.3
18	Bonatoumbe ville		902		8		8		100
19	Bonaminkano		3926		12		12		100
20	Bele-Bele		1749		10		10		100
21	Bonatoumbe village		23		3		3		100
Total				52614		269	238	238	88.4

Source: BUCREP, 2005 and 2010 projections and field work, 2023

Out of the 269 questionnaires administered to households in the Douala 4 municipality, 238 effectively responded with an 88.40%. This permitted the work to adequately draw a conclusion through results and analyses. Interview sessions with the 21 quarter heads of the neighbourhoods sampled were done to further capture data on the circulation and difficulties encountered in the area. Focus group discussions with transport authorities and NGOs as well as transporters union leaders were held to collect data on the role of the authority in the maintenance of order in the transport sector in this area. Field observation was done to collect

data on the mundus-operandi of road transport in the area and its effect on performance. In the field observation process, photographs for results were captured. Data for cartographic and map realisation were captured through the use of the Global positioning system (GPS) whereby waypoints were collected on traffic concentrated areas, road infrastructure, fly overs, bridges, markets along roadsides, pedestrian path and roadside vending in Douala 4. These data was downloaded from GPS and superimposed on cartographic shape file map of Douala 4 where the data was treated and the information presented on maps and analysed for results presentation.

An in-depth documentary research through secondary data collection was done to have detailed information on the transport sector in Cameroon in general and that of Douala in particular so as to understand the stakes of urban transport and attempt solutions. The secondary data collection was as well done to match-up the data collected from the field with existing research in order to have a good analyses for results. The National Institute of Statistics was consulted to have urban transport calamities over a certain period of time and the Traffic Police Unit consulted to match information gotten from other sources such as news reports and journals. The Ministry and Delegation of Transport in Douala were as well consulted to have information on the regularization of the urban transport sector and drawbacks observed. The data was treated and analysed and presented as results for discussions.

4. RESULTS AND DISCUSSION

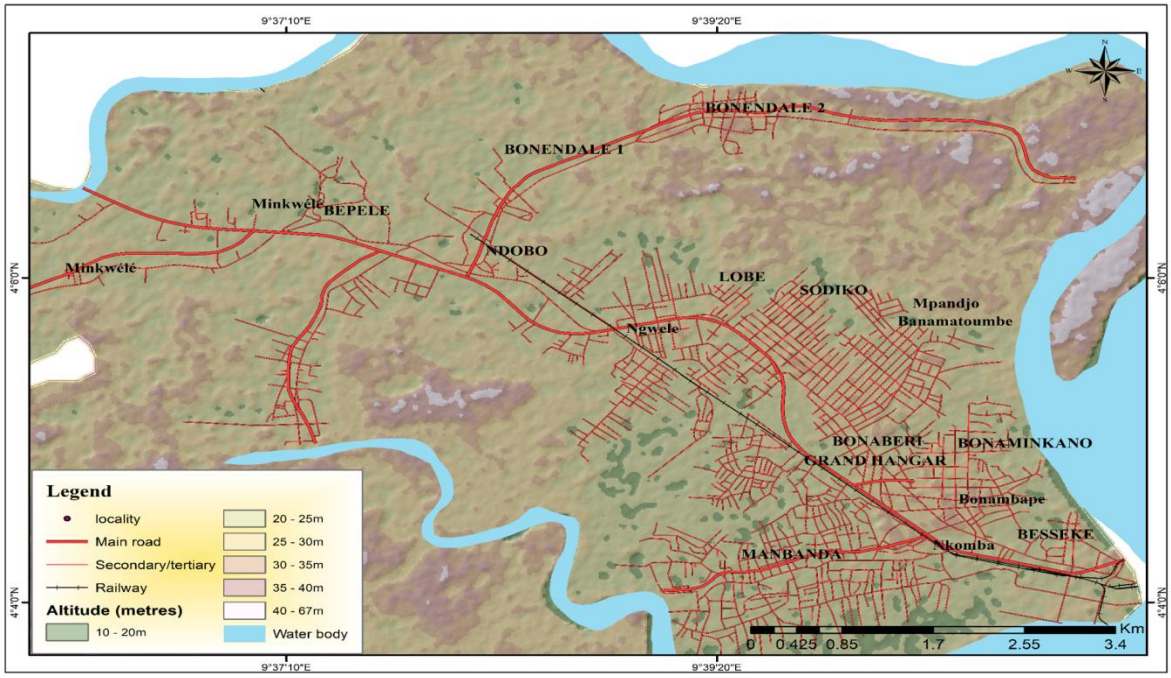
Results from findings propound that urban transport in the Douala 4 municipality is faced with mobility and management discrepancies which have affected the performance.

4.1: State of urban road infrastructure in the Douala 4 municipality

Urban road infrastructure in Douala 4 has improved and expanded in number owing to the favourable natural condition of the area. The relief of Douala 4 is gentle with the highest point being 67m above sea level. Such a relief is no doubt favourable for road construction though exposed to numerous floods when the sea and rivers overflow their banks during the wet season. The Douala 4 municipality has a gentle relief with altitude which ranges from 20m to 67m above the sea. The gentle surface of Douala has facilitated the construction of road infrastructure. The main road stretches from the south east to the north west of Douala 4 and many secondary roads are all connected to the main road. The road infrastructure in Douala 4

constitutes roads, bridges, flyover bridges and sidewalks, culverts, zebra crossing, street lights and road signs which are all interconnected to ease the movement of gods and services.

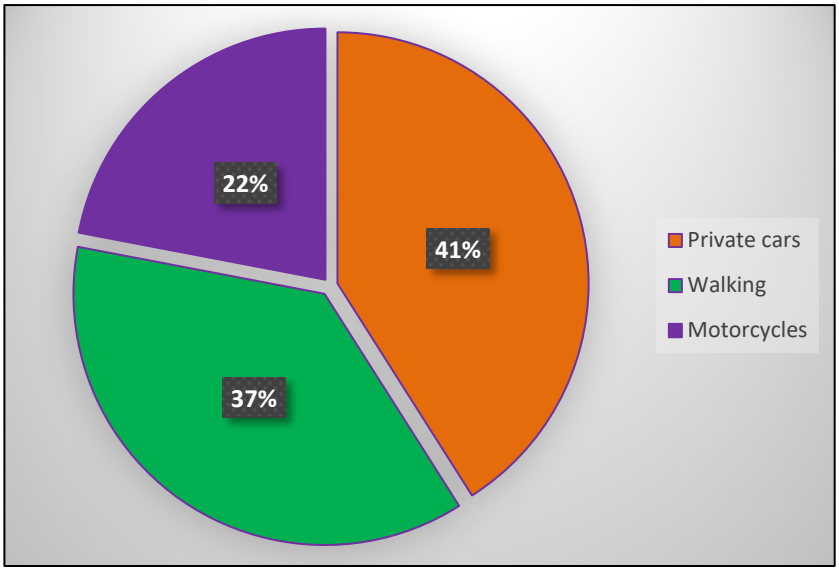
There are two main roads (NR3) in Douala 4 which stretches from East (Rond Point Deido), crossing the Wouri River via the two bridges to West direction (passing through Bonaberi to South West Region). The western section is linked to Limbe via Bonaberi on the right bank and the eastern section linked to Yaounde via Edea (JICA, 2017). Some 27 secondary roads were identified during field survey and most of these secondary roads are connected to the main road. The revelations propound that Douala 4 is connected to the West by two bridges over the Wouri River. The first bridge consisting of a roadway with railway in the middle was constructed in between 1951 to 1954 and the second bridge was constructed in between 2013 to 2017. Accessibility in the Sub-division is provided by two primary roads and limited network of secondary and tertiary roads. The primary roads run across Douala from East to West and ensure not only the connections between the Sub-division and other neighbourhoods within Douala but also connect Douala 4 to the Mungo and other regions. The secondary roads ensure the flow of traffic between secondary and primary roads. While tertiary roads pass inside neighbourhoods and are connected to secondary roads (Figure 2).



Source: Modified by Tih from NIC

Figure 2: The relief map of Douala 4

Results from finings revealed that Douala 4 is connected to the West by two bridges over River Wouri. The first bridge which is 1km long and 15m wide consists of a roadway with railway in the middle, the bridge was built in between 1951 to 1954 linking Bonaberi from the Western section of Douala to other parts of the East of Douala, and the second bridge was constructed in between 2013 to 2017 and measures 820m in length and 35m wide. Douala 4 has one flyover bridge at Texaco Fokou that was constructed in between 2013 to 2016. The bridge facilitates traffic flow at the road intersection at Texaco-Fokou Bonaberi. In Douala 4, the width of sidewalks is 1.4m, slightly below the minimum required norms and they are made for non-motorized transport. Most of the roads in Douala 4 are without cross lines only Texaco Fokou roundabout. The public entrance and popular crossing areas in Douala 4 are without cross lines. Not all parts of the roads in Bonaberi have street lights, some of these street lights are always malfunctioning and some of the poles are vandalized by car clash. There are fallen poles which are often abandoned by the municipal authorities who are in charge of installing and maintaining street lights. In Douala 4, some of the road signs include sign boards with arrows and various symbols which serve as communication tools to road users. The road transport infrastructure has influenced the pattern of traffic circulation in Douala 4, thus the different means of transport entirely depends on road (Figure 3).



Source: Field work, 2022

Figure 3: Components of private transport in Douala 4

Figure 3 shows the various means of private transport used in urban trips in Douala 4 as private cars represent 41% of the urban trips. Private transport by personal car is a means of individual transport generally common in big cities. In most developing countries, the use of private car is steadily increasing, the widely use of private car in Douala 4 is favoured by increase in income and liberalization of trade which enable individuals and car dealers to easily import vehicles from abroad. Walking makes up 37% of the urban trips and it is the most ancient and popular means of urban transport. A greater proportion of urban journeys in Douala 4 are done via walking, to some urban dwellers it is cheapest and easy means of transport because it does not demands financial expenditure and it is a sustainable means of transport. Motor circles represent 22% of the urban journeys, it highly used by those urban inhabitants who live at the city`s periphery who prefer the use of private motorcycles in order to avoid traffic and access easily to job site at the central town.

Apart from private transport, collective transport means is also used for circulation in Douala 4. Collective transport is a means of movement used to transport many people on the same trajectory. It is generally accessible to certain zones with a fixed price for certain users and varied price for certain category of passengers (Richard, Peet and Nigel Thrift, 2013). The term collective transport is translated to the common transport that is defined as a transport means put at disposal of the public to carry many passengers simultaneously, whose tariff schedules and lines are well known and planned in advance. In Douala 4, there are principally four means of collective transport which include; Societé Camerounaise du Ttransport Urbain (SOCATUR), mini-buses, taxis and commercial motorbikes. These means of transport are used by many who can't afford owning a car and movements can be assured on a daily basis. This collective transport is dominated by motorbike riding since it can easily move from one place to the other and even a door to door delivery to the advantage of the customers (Table 2).

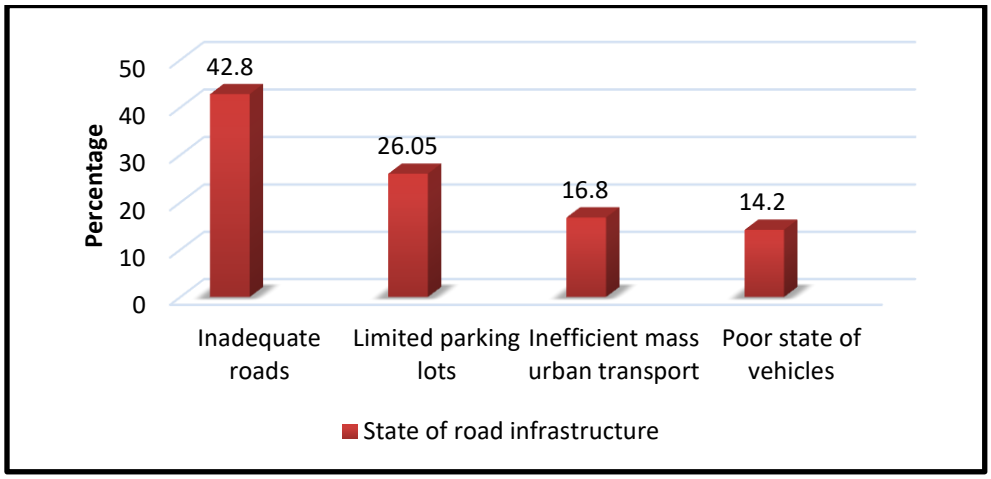
Table 2: Collective transport operations in Douala 4

Number of clusters	Number of respondents	Choice of transport services used in daily urban trips			
		Motorbike	SOCATUR	Taxis	Minibuses
North west	37	19	3	10	5
North east	36	23	2	8	3
South west	83	42	10	18	13
South east	82	39	8	25	10
Total	238	123	23	61	31
%	100	51	9.6	25	13

Source: Field data, 2022

Table 2 reveals that commercial motorbikes represent 51% of transport trips in Douala 4. The increasingly use of commercial motorbikes as a means of collective transport is because it offers door to door services and equally due to the fact that motorbikes are fast and can easily manoeuvre through traffic congestion. Taxis make up 25% of daily urban trips, the reasons for relatively use of taxis is explained by the fact that taxis fare is fairly affordable, comfort and secured to most urban inhabitants. 13% of the collective urban trips are carried out by minibuses, the reasons for declining use of minibuses is because the activity is not regulated, overcrowded and unsafe means of transport. SOCATUR, the mass urban formal transport represents just 9.6 of urban trips. The reason for low trips of SOCATUR is due the fact that its services are unreliable, no schedule travelling time and characterized by travel delays. This is due to the type of transport facilities in Douala 4 which is inadequate and does not guarantee mobility.

There are limited mass urban transport buses, this has resulted to the proliferation of informal transport services such as motorbikes, taxis and minibuses, most of the transport services are not in good state and often suffer from constant breakdown leading to risk of accident and traffic congestion. The road capacity is low, due to small road lanes and inadequate complementary road infrastructure such as non-motorized transport infrastructure, pedestrian crossing facilities, flyover bridges, speed breakers, roundabout, traffic lights and street lights. The state of road infrastructure is not cherished by many inhabitants especially in low income neighbourhood of Douala 4 (Figure 4).



Source: Field work, 2023

Figure 4: Reasons for mediocre road infrastructure in Douala 4

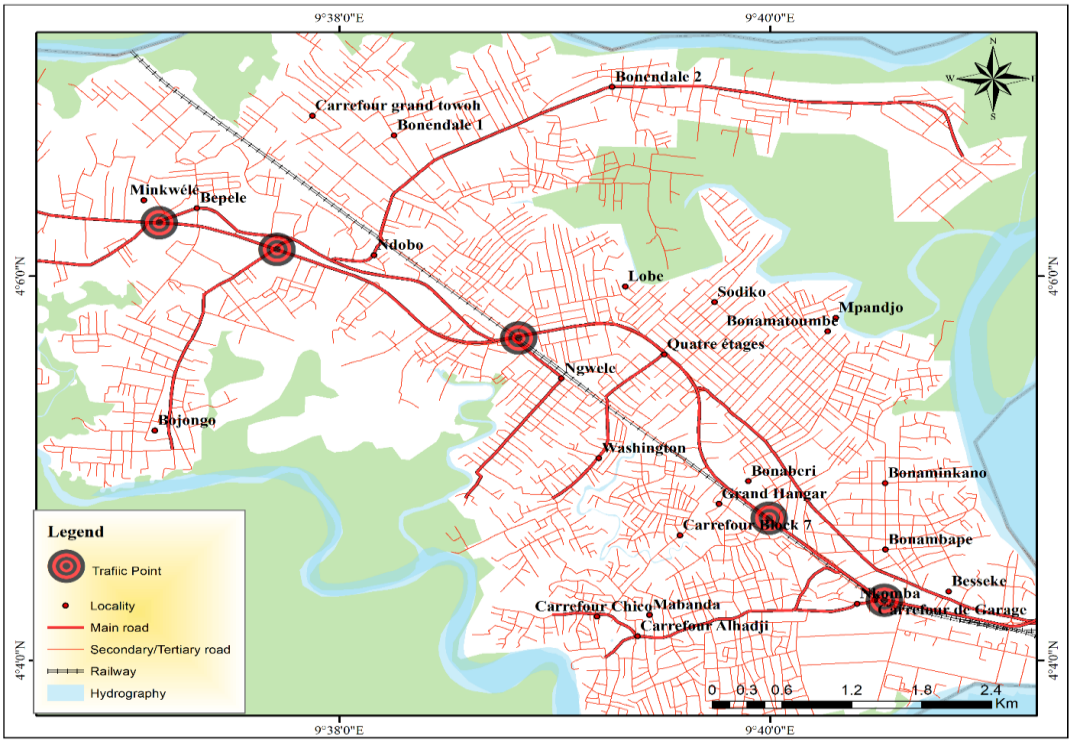
Most tertiary roads remain largely unpaved and some neighbourhoods that rely solely on tertiary roads commute over long distances to connect with secondary and primary roads. The tertiary roads are only accessible by motorbikes while some are accessible by foot paths due to poor nature of the terrain found in marshy areas. According to field results, 80.3% of the respondents acknowledged that the state of road infrastructure is poor, against 19.7% of respondents who appreciated the state of road infrastructure in Douala 4. There is a general trend of inadequate state of the roads which leaves much to be desired.

Field date revealed that the state of road infrastructure in Douala 4 is mediocre. There are few roads in Douala 4 and as vehicles rely only on these few existing roads, more pressure is exerted on the available road which in most cases causes road demand to surpass road supply, resulting in traffic congestion. This is the case with the National Highway number 3 west of Douala where vehicles coming in from the South West, West and North West Regions rely on one road from Bekoko junction-Ndobo in order to get to Bonaberi. There is limited parking space reason why it is very common to see cars parked along road side which further reduce road sizes and block pedestrian paths. Mass urban transport in Douala is highly unreliable and people have increasingly turned towards more rapid and door-to-door transport services provided by the informal sector such as motorbikes and minibuses. Ineffective mass urban transport services have consequently led to the proliferation of unregulated informal transport services whose state of vehicles in most cases are not roadworthy. The increasing use of old vehicle fleets is explained by the massive importation of second-handed cars that are out of use in western markets. Most of the passenger vehicles in Douala 4 are ageing, unsafe and often overloaded with passengers exposed to risk of accidents. Douala 4 faces a challenge in the state of the roads which render it less performant.

4.2; Traffic congestion and circulation challenges to transport performance in Douala 4

Travel delays, fatigue, long waiting at bus stops, aggressive driving and violation of traffic rules, encroachment into pedestrian sidewalk, pedestrian risk and road accidents as well as drop in drivers income and late delivery of goods are all incidents influenced by large numbers of vehicle circulation that move forward in a slow and irregular manner. Traffic congestion is generally recurrent at road intersections or roundabouts where many roads converge, as well as trade and parking. In Douala 4, road intersections and roundabout, markets situated along the road are areas where traffic congestion frequently occurs. Zones which experience frequent

traffic congestion are Bonassama roundabout, Grand-Hanga market, Rail roundabout and Ndobo-Bikoko (Figure 5). These hotbeds of traffic congestion have caused the wanton traffic delay and delivery time in the city and beyond. Figure 5 shows areas of recurrent traffic congestion in Douala 4. It reveals that immediately after crossing the Wouri Bridge from Rond Point Diëdo to Bonaberi, the road separates into two (Ancient Route and Novelle Route). The Ancient Route is at the right flank and the Nouvelle Route at the left flank. Traffic jam is recurrent at Novelle Route, the roundabout at the entrance to Mabanda, other traffic hotspot occurs again at Marché Grand Hangar on Novelle Route, about 100 from Garage. The two roads intersect at Texaco Fokou where they form one road and continue to Ngwele to Rail Roundabout where traffic jam is high almost throughout the day. From Rail Roundabout, another traffic hotspot occur at Ndobo at Carrefour Bojongo, from Carrefour Bojongo going westward to the Mungo corridor, traffic congestion is recurrent at Bekoko junction as well (Figure 5).



Source: Field work and data for NIC, 2023

Figure 5: Traffic jam hotbeds in Douala 4

Traffic congestion in Douala 4 is caused by limited parking lots, unsustainable urban land use, heavy trucks, inefficient mass urban transport, and poor management of intersection. Revelations

from field data propound that traffic congestion in Douala 4 is dominated by inadequate road capacity (Table 3).

Table 3: Factors of traffic congestion in Douala 4

Number of clusters	Number of respondents	Main causes of traffic congestion in Douala IV						
		Limited roads	Presence of heavy vehicles	Poor of intersections	Unsustainable urban land use	Limited parking lots	Inadequate mass urban transport	Faulty vehicles
NW	37	10	5	5	7	4	3	2
NE	36	11	4	4	6	6	3	3
SW	83	20	11	14	17	9	7	5
SE	82	18	12	15	15	10	8	4
Total	238	59	32	40	45	27	21	14
%	100	24.7	13.4	16.8	18.9	11.3	8.8	5.8

Source: Field work, 2022

Table 3 shows that inadequate road capacity represents 24.7% of the sources of traffic snarl-up, unsustainable urban land use made up 18.9% of the factors responsible for traffic jam, poor intersections represent 16% of the source of traffic holdup, the presence of heavy vehicles constitute 13.44% among the factors of traffic jam, limited parking lots represents 11.3% of the traffic congestion source, lack of efficient mass urban transport made up 8.8 among the determinant of traffic jam while faulty vehicles represent the least 5.8% among the factors of traffic congestion. Commercial activities have greatly increased the traffic congestion observed in Douala 4 (Plate 1).

Plate 1: Commercial activities and parks along junctions in Douala 4

Tih, 2022

Plate 1 shows road vending in the Rail Bonaberi roundabouts in A, and Grand-Hangar stretch in B of the Douala 4 municipality. The proliferation of commercial activities and parking at roads intersections and roundabouts create traffic congestioin because it pulls in many activities to establish here, this makes junction busy spots. Freight vehicles possess distinguishing characteristics from those of passengers that often predispose them to diverse traffic challenges in urban transport system (Djatcho, 2022). The circulation of trucks in Bonaberi is high especially during weekends and it creates significant traffic congestion in Douala 4. Vehicle stall temporally halt traffic flow and the malfunctioning vehicles bock the road and impede other vehicles from moving which triggers traffic jam. Traffic jam which is a growing concern has repercussions on mobility and transactional activities in Douala 4.

Traffic congestion in Douala 4 has led to travel delays and lateness at work, encroachment into sidewalks, long waiting at bus stops, violation of traffic rules and accident risk. Field data revealed that travel delays and lateness represents 28.6% of the inconveniences of traffic snarl-up on mobility, encroachment into sidewalks 24.4%, long waiting at bus stops made up 20.1 %, and violation of traffic rules constituted 14.7%, accident risk represented 12.2 among the consequences associated to traffic congestion (Table 4). Table 4 shows that 28.6% of the respondents attested that increased travelling time is one of the implications of traffic congestion on mobility. This is because their daily urban journeys are usually delayed and consequently leading to lateness at job sites and other daily activities especially during rush hours. Encroachment into sidewalks represents 24.4% of the inconvenience caused by traffic congestion on pedestrian paths. Motorists especially bike riders often encroach into walkways during period of intense traffic congestion, consequently depriving pedestrian access to sidewalks. Long waiting at bus stops represents 20.1% of the mobility challenges resulting from traffic hold-up.

Table 4: Impact of traffic congestion on urban mobility

Number of clusters	Number of respondents	Impacts of traffic jam on mobility				
		Increased travelling time	Encroachment into sidewalks	Long waiting at bus stops	Violation of traffic rules	Accident risk
NW	37	10	9	7	3	8
NE	36	10	7	5	3	11
SW	83	25	20	11	10	17
SE	82	23	22	12	13	12
Total	238	68	58	35	29	48
%	100	28.6	24.4	20.1	14.7	12.2

Source: Field work, 2022

During traffic congestion the safety gap between one vehicle and the next reduces, as a result, the tendency of vehicle to hit one another increases. Also the encroachment of motorists into sidewalks increases pedestrian risk of accident. Congestion affects speed and smooth traffic flow, this affects a wide range of activities, services, and market opportunities in the cities which can be best delivered through mobility. The table below shows a reduced number of trips and income of taxi drivers as a result of traffic congestion (Table 5).

Table 5: Traffic congestion and income level in Douala 4

Work days	Expected no. of trips (off peak traffic hours)	Actual no. of trips (peak traffic hours)	Expected income (CFA) (off peak hours)	Actual income (CFA) (peak traffic hours)	Drop in income (CFAF)
Monday	20-30	20-25	6000-9000	4000-6000	2000-3000
Tuesday	20-30	20-25	6000-900	4000-6000	2000-3000
Wednesday	20-30	20-25	6000-9000	4000-6000	2000-300
Thursday	20-30	20-25	6000-9000	4000-6000	2000-3000
Friday	20-30	20-25	6000-9000	4000-6000	2000-300
Saturday	15-20	10-15	5000-7000	4000-5000	1000-2000
Sunday	-------	--------	--------	-------	------

Source: field work, 2022

Table 5 shows the average number of trips and income generated by taxi drivers based on situation of ‘‘off peak traffic’’ and situation of ‘‘peak traffic hours.’’ The respondents were asked the number of trips which they were able to make on the normal day as well as income level based on the current transportation situation in Douala 4 and what they were expected to make. According to data gathered from taxis drivers during field survey, they underscored that they make maximum of about 20-30 trips during off peak traffic hours and 20-25 trips during peak traffic hours in Douala 4. Traffic congestion has greatly affected movement in Doula 4 and consequently the performance of road transport in the area and beyond.

4.3: Road transport performance challenges in Douala 4

Road transport performance in the Douala 4 municipality is affected by several challenges such as administrative, socio-economic as well as communication issues. Administrative challenges are those that emanate from authorities and their network which affects the performance of road transport. A series of administrative challenges such as poor

urban governance, multiplicity of shared responsibilities among ministries and organs (councils), weak enforcement of traffic rules, difficulties of controlling administrative vehicles and military officers, weak rules for formal entry into road transport affect the performance of road transport in Douala 4. Data from field work revealed that poor governance is the main administrative challenge to transport performance (Table 6).

Table 6: Administrative challenges of road transport performance in Douala 4

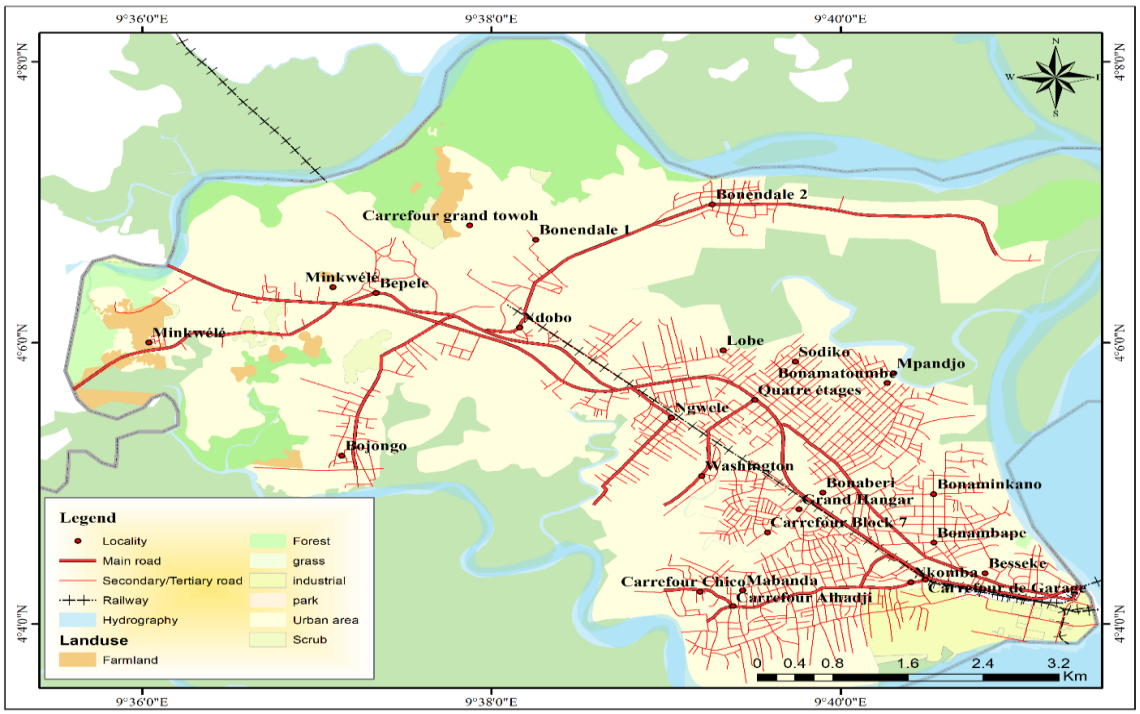
Number of clusters	Number of respondents	administrative challenges affecting the performance of road transport				
		Weak enforcement of traffic rules	Weak rules of formal entry into road transport	Poor governance	Multiple institutions	Difficulties in controlling administrative vehicles
NW	37	8	6	13	9	1
NE	36	7	5	13	11	0
SW	83	16	12	33	20	2
SE	82	17	15	31	18	1
Total	238	48	38	90	58	4
%	100	20.1	15.9	37	24	1.7

Source**:** Field work 2022

Poor governance (37%) stands out to be one the main administrative challenge perturbing road transport performance. Poor governance is explained by the fact that civil society are not often involved in the execution of road infrastructure projects and most of the projects do not meet the required expectations and there is weak accountability. Multiple institutions (24%) stand out to be among the serious issues affecting the performance of road transport. This is justified by the fact that road administration spread across many ministries and organs which leads to bureaucracy in execution of road projects and effective follow up of the road transport sector. Weak enforcement of traffic rules (20.1%) constitute another challenge to road transport, this is explained by the fact that traffic rules are not fully applicable which gives rooms for disorder to reign in urban road transport sector in Douala 4. Weak rules for formal entry requirements (15.9%) also act as a stumbling block to road transport performance in Douala 4. These results from the fact that the formal rules required to enter into road transport sector are not strict. Difficulties in controlling administrative vehicles and uniform officers (1.7%) are also a challenge to traffic flow.

Communication challenges as well affect the performance of road transport in Douala 4. Douala metropolis has the most dense road transport network in Cameroon which has gone a

long way to enhance commercial and industrial activities of the city (.Fombe and Balgah, 2012). The manner in which its population and commerce as well as industrial activities are growing warrant efficient transport system to ensure free circulation of persons, factors of production, goods and services. However, the urban transport facilities of Douala 4 cannot sufficiently cope with fast growing transport demand. This is explained by the fact that the road transport sector of Douala 4 is plagued with a series of communication challenges such as; Non-integrated transport system and inadequate facilities for non-motorized transport shows the road network of Douala 4 (Figure 6).



Source: Modifed from NIC by Tih, 2022

Figure 6: The road network of Douala 4

Figure 6 shows the road network of Douala 4 where, the road network, the main road stretches from the east across the Wouri Bridge to the west and along the main roads. There are secondary and tertiary roads linked to the main roads and linking the various neighbourhoods in Douala 4. Transportation of passengers, goods and services is done mainly by road. There is also a railway that runs from east to west. This railway begins from the eastern line (Yaounde-Edea-Douala) and link Bonaberi to Nkongssamba and Kumba in western line. The western line transport timber, cocoa, and other manufacture goods, the rail transport is inter-urban and not

interconnected to road transport for intra-urban use and do not transport goods and people within Douala. Douala 4 is surrounded by water bodies made up creeks and these water bodies are not developed for intra-urban transport use, thus the principal mode of transport used is road. Thus, due to less development of other modes of transport and non-integration of road transport to other transport modes for intra-urban movements, there is over dependence on road transport mode which has an adverse consequence on circulation.

Furthermore, the lack of an integrated transport system has hampered performance in Douala 4. The transport system of Douala 4 is not interconnected with other transport modes such as railway transport and waterways except the road transport sector which is used for intra-urban transport. Other modes of transport such as rail and waterways are not developed for intra-urban circulation. This has made the movement of people, goods and services to rely mainly on road transport thus increasing the pressure on road transport infrastructure. Such pressure with inadequate available infrastructure has affected performance.

Social and economic challenges have as well affected the performance of road transport in Douala 4. Road transport in Doula 4 is confronted with a wide range of socio-economic challenges which range from limited finance, high transport fare and high consumption of fuel, amongst others. The social challenges ranges from slow response to accident emergency, high use of road unworthy vehicles, reckless driving and unregulated informal transport. Field results reveal that reckless driving is the major cause of social ills plaguing road transport in Douala 4 (Table 7).

Table 7: Social challenges to road transport in Douala 4

Names of clusters	Number of respondents	Social problems associated with road transport in Douala IV			
		Reckless driving	Use of road unworthy vehicles	Slow response to emergency	Unregulated informal transport
NW	37	15	10	9	3
NE	36	13	9	11	3
SW	83	37	21	18	7
SE	82	36	19	17	10
Total	238	101	59	55	23
%	100	42.4	24.7	23.1	9.6

Source: Field work, 2023

Table 7 shows the various social challenges affecting the performance of road transport in Douala 4. The table shows that 42.4 % of the social challenges plaguing road transport performance in Douala 4 come from reckless driving. This is due to the fast emerging rate of reckless driving attitudes amongst drivers who are seen on daily basis driving at excessive speed, driving against traffic, over taking road lane, disrespecting traffic signals and changing lane unsafely. Consequently, road accidents have become very common. As concerned use of faulty vehicle, 24.7% of the respondents attested that the use of road unworthy vehicles is rapidly increasing. This is explained by the fact that malfunctioning vehicles are highly used for both private, commercial purposes. Slow respond to emergency represents 23.1% of the social challenges of road of road transport in Douala 4. This is justified by the fact that there is no timely intervention in emergency cases such as car crash which often result to severe injuries as the ambulance usually come late and in most cases ambulances are absent especially in the peripheral zones. Unregulated informal transport services represent 9.6% of the social challenges explained by the fact that the activities of the informal transport services such as motorbikes, mini-buses are not well regulated.

Economic challenges have also played a role in the performance of road transport in Douala. These challenges include inadequate finance, high fuel prices, high transport fare, and unstandardized transport fare amongst others. Fuel prices have steadily been increasing in Cameroon since 2008 and this has direct implications on the road transport services. This is due to the fact that cars used in Cameroon in general and Douala 4 in particular solely relies on fossil fuel as a source of energy. Thus whenever there is an increase in fuel prices, the burden is felt by motorists who use fuel on daily basis for running their cars and automatically shifted to passengers who pay transport fare on daily urban trips. High transport fare is another challenge affecting the performance of road transport sector in Douala 4. Transport fare has progressively increased in Cameroon since 2014. High transport fare is highly felt by low income earners who spend much of their income on transport fare. Unstandardized transport fare is a setback to road transport mode in Douala 4 which warrant attention. There is a discrepancy in transport fare in Douala 4 as the transport fare for motorbikes, taxis, mini-buses vary in the same distance. Though the taxi fare is fixed at 250-350FCFA, mini bus fare which vary between 200-300FCFA are fixed by the drivers themselves and there is no official fixed transport fare for motorbikes. Taxis at times charge higher than the fixed transport fare depending on the distance and events

such as during traffic congestion, and changes in weather conditions (during rainfall). Motorbikes don`t have fixed tariff since the transport fare depends on the distance and on negotiation. The fare for motorbikes generally ranges from 100 to 500CFAF and it may go beyond 1000FCFA in some cases. Lack of a mandated transport fare gives commercial drivers the advantage to exploit passengers, which makes it difficult for some urban inhabitants to afford. As such the mobility of urban dwellers with low income is adversely affected as they find it difficult to afford the increasing transport fare. Insufficient finance to carry out the construction of giant road infrastructure and maintenance is as well a challenge to road transport performance. Road transport in the Douala 4 municipality would be more performant if these challenges and more are addressed.

5.0: CONCLUSION AND SUGGESTIONS

Urban road transport performance in Douala 4 is hindered by challenges which have unfortunately triggered disorder in circulation and congestion. This article which sought to investigate the challenges to performance of road transport in Douala 4 adheres to the fact that inadequate roads sizes, limited parking lots, inefficient mass urban transport, and poor state of vehicles amongst others have affected performance. As a result of these drawbacks, the Douala 4 municipality is experiencing unadorned traffic congestion from poorly managed road circulation which produces exhaustible delays and delivery time. The delays however have been triggered by limited road intersections, lawless roadside parking, non-respect of traffic control lights, unwanted road accidents as well as rebellious circulation of heavy duty vehicles. Faced with these challenges, road transport circulation in Douala 4 is set to be less performant and the effect is the disorder observed in the area. This article found out that both the administrative authorities as well as the road users have contributed to the disorder accrued. Despite the extension of the road network of Douala 4 which was accelerated by rapid population growth and the booming economic activities of the 1970s that generated high transport demand, traffic delays are still observed. As a result, the State and the local government authorities have resolved to build more road infrastructure in order to meet growing urban mobility demand in Douala 4. Unfortunately, the construction of a second bridge across the Wouri and re-adjustment of the Bonaberi old road has not stood the test of time thus tantamount to the poor performance observed. Faced with these difficulties, this paper introduces some suggestions which if taken into consideration will increase road transport performance in Douala 4 and beyond.

It is recommended that the National Highway number 3, linking Littoral to the West region of Cameroon that passes through Douala 4 be upgraded. This can be done by constructing other alternative roads so that vehicles coming from the North West, West and South West Regions to Douala and beyond can get to their destination without necessarily passing through Bonaberi. In this way, traffic decongestion will be evident and wanton delays will be reduced at best. Traffic rules should be enforced with strict follow-up form State authorities and sanctions meted to defaulters in order to reduce if not wipe out the disorder observed. Intersection design should be improved in order to reduce traffic congestion at road intersections and at roundabouts. Parking at roundabouts and road intersections as well as roadside vending on highways should be prohibited in order to allow free circulation of goods and services. Dedicated pedestrian crossing facilities at road intersections should be provided in order to ensure safe crossing of pedestrians. Traffic signs and signals at road intersections should be adequately set up to control vehicles and pedestrian circulation. On-street parking should be provided only after adequate provisions have been made for higher priority transport modes, including walking, cycling and public transport. Where on-street parking is provided, market-based parking fees can help manage demand. In addition, robust parking enforcement mechanisms are needed to ensure that walking and cycling facilities, once built, remain well maintained and free of encroachments. Pressure on road transport should be reduced, by investing on other transport modes such as rail and tramp way to reduce burden on the roads. In this way, the transport system will be integrated, whereby road transport is integrated into other modes of transport such as rail and inland transport. Therefore, if rail transport and inland water transport modes are fully developed, pressure on road will be reduced and circulation in Douala4 and beyond will be easy.

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