

THE NATURE OF ROAD DESIGN: RISKY TO MANAGING HARGEISA-BERBERA HIGHWAY SAFETY, SOMALILAND

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Abstract: Traveling through Hargeisa-Berbera highway that is used by increased car populations without any traffic control systems comes with unprecedented number of accidents. This thesis proposal navigates into the nature of the road design and how risk it is in the management of highway safety. This highway is predominantly unsafe when it comes to road safety. Road traffic crashes are covered in the media as events—not as leading killer of people and an enormous drain on a country’s citizens but also a disruption of economic connectivity. A qualitative investigation involving in-depth interviews, participant observations, and experimentation and focus group discussions were the major methods of data collection. The main argument in this paper is that design of a highway using best practices could minimize the notorious highway fatalities to save more lives and accelerate and connect Hargeisa-Berbera road safety. It is also important to note that paving a highway by any standards does not guarantee reduction in the associated fatalities. Government must ensure all citizens (drivers, passengers and pedestrians or inhabitants living along the highway) are educated on highway safety to save more lives and property.

Keywords: Highway, design, road safety, Hargeisa and Berbera.

I. INTRODUCTION

1.1 Background to the Study

Roads play an important role in connecting regions and markets for trade and service delivery. No country can build a sustainable economy without resilient road network connecting all business centres and people. However, designing sustainable roads in a developing post-conflict country can be met with operational challenges. This research paper explains the background issues regarding the existing design for road construction in Somaliland. Some brief literature has been examined and then arriving to stating and conceptualizing the problem under study. The study stated the purpose and outlined specific objectives that have been addressed in the analysis section.

Road designing is an economic priority in the view that roads are the main pillars of regional connectivity. This perspective is a global reality. World’s populations, goods and services are mainly transported by road transportation means. In Great Britain, 90% of passenger journeys were by road in 2014 ... while the distance travelled by car or vans has increased by over 1000% (George & Kershaw, 2016). This mode is not likely to have changed today. According to empirical findings by WHO revealed startling statistics recording approximately 1.3 million people’s annual deaths on the global road crashes ... with number expected to rise to 1.9 million by 2025 (cited in Kapila et al., 2013). Action is awaiting governments of the world to mitigate the anticipated road disasters.

Road transport is a very dominant mode in the African continent with echoing road safety as a major concern. Southern Africa is particularly marked by deteriorating roads due to traffic loading and environmental forces not limited to rainfall, ultraviolet radiation and temperature (Maina, 2008). As if this is not enough, road traffic mortality in Africa has been

cited the highest in the world (Patvora, 2008). The sustainable design of the roads largely determine human, goods, and other traffic safety. This is why some cities in Northern Europe which have

“... witnessed a trend of reclaiming urban space from automobile and prohibiting cars from major parts of downtown areas and/or confining them in other ways, are considered as leading examples of sustainable urban development, having met sustainability urban standards such as improving public road transport, encouraging non-motorised modes, creating pedestrian zones ...” (Pojani and Stead, 2018).

As developing countries in Africa, we may not compete with northern Europe in meeting sustainability standards with growing poverty levels but could borrow a leaf and implement appropriate road designs. However, this does not mean that European countries are immune to road accidents. EU reported 25,700 road deaths in March 2014 ... around 1% deaths in 2013 than 18% in 2010 (European Union, 2015). One could however project that the already mentioned above reality that road deaths in sub-Saharan Africa are worrying.

Somaliland De-factual republic is predominantly unsafe when it comes to road safety. Road traffic crashes are covered in the media as events—not as leading killer of people and an enormous drain on a country’s human, health and financial resources (Chan, 2013). According to the local reality, most of the road accidents and traffic damages resulting from inappropriately designed roads go undocumented.

For Somaliland, it is clear that the 1988 civil strife between Somaliland and Central Somalia damaged all sorts of infrastructure including roads. Ali (2012) reminds us that the civil war not only severely damaged and deteriorated the country’s road network but also the collapse of authorities responsible for providing maintenance of such infrastructure. Despite this painful political and economic history, Somaliland’s self-directed independence has led to its stabilisation for over two decades experiencing increasing urbanisation especially in Hargeisa city among other business centres. The current unplanned roads and city hosted by Somaliland are believed to have been constructed by British in the 1960s. Road design standards were hardly given consideration. For over two decades of negative peace, the country’s administration has never thought of re-designing the it’s urban connecting roads with designs ranging from pavements to drainage systems, livestock crossing, zebra-crossings, to name but a few. Congestion and increased traffic population are very irreversible with a young government unwilling demolish the increasingly expanding Hargeisa city. In particular, the Hargeisa-Berbera highway that is strategically connecting the country to the rest of the world through the Gulf of Eden is the riskiest without road design standards. A recent traffic count sponsored by CONSER Engineering Company-Hargeisa documented a total of 7562 public/private and duty cars that travelled through Hargeisa-Berbera highway in only one week (Hallaye Checkpoint, 2016). Unprecedented increase in road transportation places considerable burden on people’s and livestock health—in form of road traffic injuries or mortality along this busy highway. Accidents are particularly a major concern along this narrow highway used by both people, livestock and uncontrolled vehicles of any kind that make it extremely difficult and dangerous for pedestrians to cross.

Traveling through Hargeisa-Berbera highway that is used by increased car populations without any traffic control systems comes with unprecedented number of accidents. While it is true that developing countries are unable to deal with congestion due to their shortage of enough land devoted to roads according to (Starkey and Hine, 2014), Somaliland hosts a very sparsely populated landmass connecting Hargeisa and Berbera Shipping City.

Since the end of the devastating 1991 civil war on infrastructure, Somaliland has been experience average stability with some recovery though engulfed with negative peace. Serious policy regulations can play significant roles in sustainability management in the transportation sector. While the Somaliland road policy prioritises “maintenance, feasibility; and full construction of Berbera corridor road, rehabilitate rural and feeder roads, establish and enforce road safety standards, develop transport policies and laws, review the financing system for the maintenance of roads and create an enabling environment for participation of private sector in road investment,” (National Development Plan 2012-2016, 2011); road safety standards are largely on paper than procedural action. In another perspective, it has been noted that Somaliland and its neighbouring Puntland need empowerment to implement the available policies (Somali Joint Needs Assessment, 2006). Having policies in place in a country like Somaliland without skills capacity to do the job is a national vulnerability. This is a policy gap that needs to be filled through equipping engineering institutions in Somaliland with necessary facilities to empower road engineers appropriately. This is long term. The short term is to source highly skilled engineers in the neighbouring/foreign countries to facilitate implementation of road designs and construction arrangements.

According to empirical evidence, “proper road design is crucial to prevent human errors in traffic and less human errors that could result in less accidents” (Ruyters et al; 1994). However, the use of sustainable design in road construction projects is a new concept in Somaliland. For all roads that are constructed in this De-facto republic, road design standards are not put into consideration and are therefore unavailable thus increasing risks and multiply road safety problems. Hargeisa-Berbera in particular, is not excluded the riskiest highway due to its strategic importance as a shipping route connecting all market centres in the country. On the construction of this highway, sustainable road designs are overlooked or less implemented without considering the life cycle of the highway. This results in almost annual costly renovations which harms resilience national development. Besides, heavy trucks, small vehicles, pedestrians and livestock use the same highway and thus multiplying road accidents. Transportation of goods and services connecting the shipping route and the capital city is largely endangered during renovation times with major delays or increases technical problems between business players in the in the two neighbouring cities. This research seeks to unveil a number of sustainable best-practices that are systematically consistent in order prevent unintended use of highway and therefore increase safety standards for people, goods and services on road transport.

The major purpose of the study was to investigate the nature of road designs hindering highway safety management along Hargeisa-Berbera highway. Specifically, the study was aimed at; describing the existing nature of road designs, analysing the highway fatalities along the Hargeisa-Berbera highway, describing the relationship between roads and markets and stating the environmental road sustainability.

1.2 Conceptual Framework

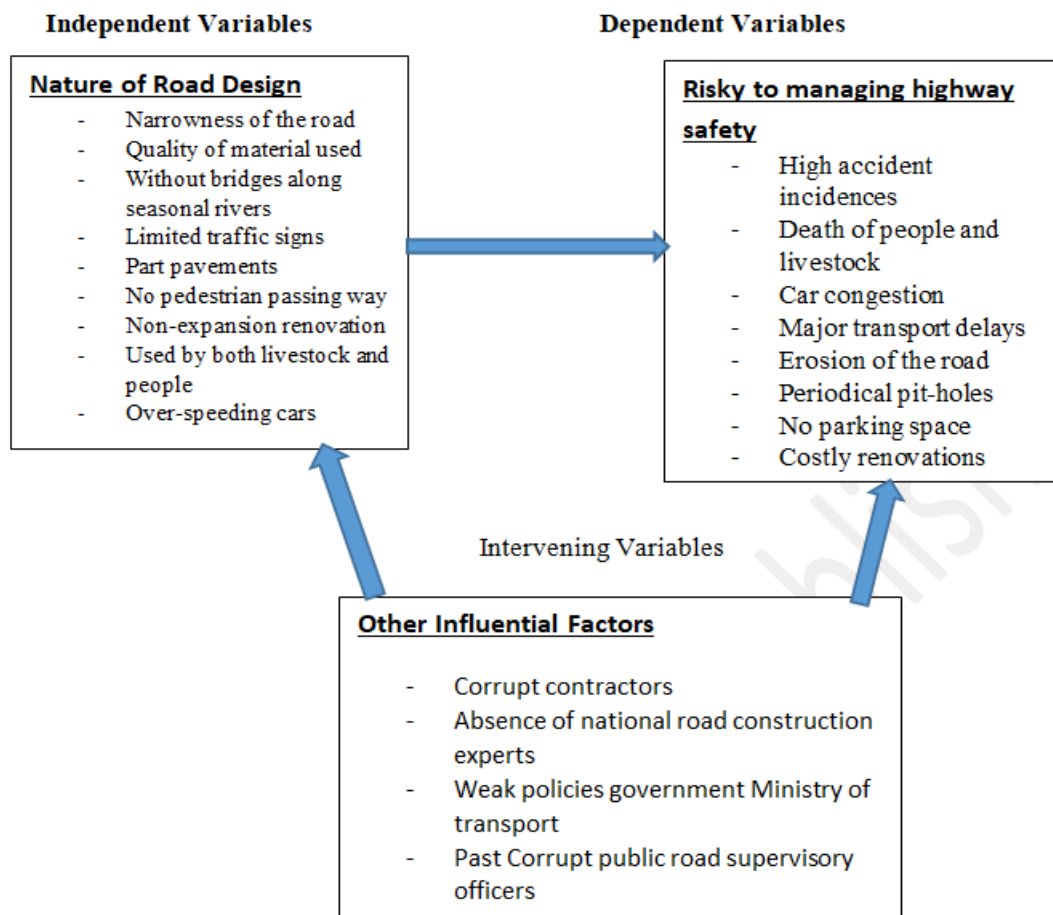


Figure 1: Conceptual Framework

Explanation

The diagram above explains the relationship between variables. It illustrates how the risky management of highway safety is dependent on the nature of the road design. There is a strong link between high accident incidences, car congestion, parking space shortage, major transportation delays and narrowness of the existing road.

The usage of the same road by heavy/transit goods lorries/trailers together with private and public transport means can have the ability to destroy the likely low quality-built highway/road. Thus rendering soil/galley erosion inevitable. The periodic pit-holes are inevitable though at times minimised by costly annual renovations.

The Hargeisa-Berbera highway is said to have been destroyed by corrupt Lebanese contractors in the 1990s who destroyed all the major bridges in order to steal huge amounts of money. One could imagine that corrupt public officials in the host country at that time could have been bribed by the Lebanese contractors and shared the money budgeted for building bridges. This causes major transport delays during the rainy season today. It causes a major threat to businesses and households along this highway without drainage systems even through the city centre, making it impassable when rains come. Floods attack people's shops and households and disrupts the businesses for several days causing financial losses to business men and women; and hindering public tax collection.

The existing roads without complete pavement, largely makes it difficult for pedestrians to avoid walking along the unsafe highway that is used by over-speeding irresponsible drivers.

Most of the renovations taking place along the Hargeisa Berbera highway are rarely involving road expansion which is not addressing the cost of increasing car population along this road. The safety of people and livestock is complicated by absence of traffic/road signs. The current highway design is more risky for all road users leading to mostly unintended road accidents.

Shortage of skilled road construction engineering manpower in Somaliland, makes it difficult for the country to apply intrinsic supervision of corrupt contractors. Highway safety gaps are worsened by absence of strong road transport policies to regulate all the stakeholders and key players in the transportation sector of Somaliland.

2. METHODS AND TECHNIQUES

2.1 Introduction

There is a general lack of information in road designing and highway safety that make it extremely difficult to make practical intervention in highway safety to minimise human fatalities. Abugessaisa (2008) writes that various "countries have definitions of problems, no data collection process or simply low-quality data availability, all of which are important for auditing road safety and supporting international comparisons." This could imply that there are many cases of accidents, injuries and deaths that go unreported that limits possibilities of best practices intended to increase road safety. The Hargeisa-Berbera highway is not exceptional. This section explores the methods and techniques that were applied during data collection, how data analysed as well as the ethical behaviour. Access to quality data could guide future road designs for safety purposes and evidence-driven decisions.

2.2 Study Area and why?

The Hargeisa-Berbera highway is the riskiest highway in Somaliland that does not take a full day without accident. If it doesn't affect human lives, it involves various livestock deaths. You cannot travel twenties kilometres without seeing a dead animal along this highway. It is still the same road with highest number of seasonal bridgeless, wider rivers that are impossible to cross during the rainy seasons even by heavy trucks and transit vehicles. The increasing demography in terms of traffic, rural-urban migration and increasing business opportunities across Somaliland and deaths related to heavy rains or irresponsible driving, motivated my choice of this study. Therefore it is highway that needs special attention when it comes to road design for safety management by Somaliland Government.

2.3 Research Context

The Hargeisa-Berbera highway is a very sensitive research area especially for foreign students like myself. It is hosted by precious natural resources that are highly protected by government and clan presence. The same highway is the major route to the former and current excellency presidents of Somaliland on top of being the busiest shipping route connecting Berbera coast not only with the other inland cities and populations and business but also linking Somaliland to Europe, Asia, Australia and the rest of the world. This highway is of greater strategic importance that is politicised and attracting competing local and international interests in Berbera port. Therefore, a research study in such a socio-economically and politically monitored requires a highway that meets safety best practices that could reduce recurring road accidents. Foreign students do not have equal rights to information sharing as the local somali students. The former may be perceived with suspicion leading to withholding of relevant information by various participants such as security personnel

and other highway research participants. So, accessing primary data for this study, from various stakeholders required working with a local research assistant in physical interactions with the local people.

2.4 Research Design

This study will be conducted by using a cross-sectional design. According (Ruyters, H.G.J.C.M et al., (eds) 1994) cross-sectional approach “measures of the safety effectiveness of design standards ... in which the relationship between design and safety is deduced from an analysis of the variation in accident frequencies which occur as a result of site to site variations in design.” Understanding the times accidents occur and their severity along the Hargeisa-Berbera highway is key to evidence-driven designs and possible re-designs aimed at mitigating highway fatalities. The study necessitated a qualitative interaction between the researcher and the road participants such as police, medical personnel, drivers, pedestrians and communities living along the highway understudy to analyse traffic flows. The cross-sectional studies conducted by Machin and Campbell disclosed that when multiple populations are engaged in a conversation regarding any object or feature at a single point in time, the researcher can see the differences or comparable facts (2005).

An engineering highway designer interacting with the research participants purposively selected to share their accident experiences common along Hargeisa-Berbera highway; made it possible to capture first-hand realities that could guide appropriate highway; and meet geometric design standards and gradually minimise highway fatalities.

2.5 Target Population

To avoid any biased data, this study targeted various participants that experience Hargeisa-Berbera fatality consequences. Medical staff in private and public hospitals of Hargeisa and Berbera that are involved in the treatment of road injuries and deaths; traffic police and drivers who operate along this highway and communities located/living side by side of the highway under study; livestock farmers whose fenceless farms host the highway as well as the public and private divers that cruise through Hargeisa-Berbera highway on a daily basis are the proposed target population categories.

2.6 Sampling

2.6.1 Sampling procedure and sample size

Baker’s second Rule of Thumb has been applied to calculate the sample size. This rule suggests “a standard of evaluation as 95% confidence with a sampling error of plus or minus 5% as compared to the results you would have gotten if you had collected data from everyone”. Baker’s experience is common to that various researchers who find it difficult to access the entire sampled group of research participants but as researchers, we must always strive to achieve at least 95% which is a standard representation of the rest of the population. In order to calculate sample size, Baker recommends application of this specific formula:

$$n=385/((1+(385/N)) \text{ whereby } n=\text{sample size, } N=\text{Total Population.}$$

The total population covering the study area was estimated by my research assistant to be 180 people all together.

$$n=385/((1+(385/N))$$

$$n=385/((1+(385/180))$$

$$n=385/((1+(2.13))$$

$$n=385/((3.13))$$

$$n=385/3.13$$

$$n=123$$

Therefore, the planned sample size was equal to 123 although only 50 participants were accessible at the study area.

2.6.2 Sampling technique

Purposive sampling was used to gather information from all the accessible participants. This technique was applied on the justification that it allows the researcher to access right or appropriate information from the right people. For example, it was expected that traffic police host a database of traffic populations, traffic accidents and injuries while medical personnel involved in the treatment of traffic injuries are potential primary data sources. This is true with livestock farmers whose animals are killed by over-speeding drivers as well as business communities whose shops and businesses

are operated along the Hargeisa-Berbera highway. It was expected that these people were/are familiar with the highway fatalities and critical motorised risks.

2.7 Data Collection Methods

2.7.1 In-depth interviews

It is not always a guarantee that a researcher conducting fieldwork will gain the required information to guide any intervention practices. One can also maintain that not every researcher in the field gains relevant information by asking questions as planned. Dawson states that “researchers have to be able to establish rapport with the participant—they have to be trusted if someone is to reveal intimate life information” (2002). Gathering data in Somali project when you are a light-skinned foreign researcher may come with disadvantages of denial to particular information. However, I happen to have won a government-funded road design project for the same highway that I studied which made it easier for me to mingle easily with some research participants at various levels. As a manager of the project, it is largely likely that local people as well as administrators in the target population would wish to identify with our project. But this did not mean that all participants were readily willing to share sensitive information. They felt interacting more comfortably with the research assistant. Abugessaisa (2008) once stated that it is a “prerequisite for improving road safety is information about accidents, fatalities, injuries, and roads, to help access the current situation and also give a good indication of severity.” First hand data can provide a good base for strategic interventions in which all road users feel safe. In this research, every opportunity for accessing the right information was used to achieve commendable results.

People’s life experiences and daily observations of traffic movements and interaction with human beings can be a good determinant for reliable information during the study. According a previous world report on Road Traffic Injury prevention, “...the importance of collecting accurate, reliable and good quality data on the magnitude of the road traffic injury problem in all countries and recommendation that data systems should be put in place to develop evidence-driven road safety policies” (WHO et al., 2014 cited in WHO 2015) was put at the forefront of global agenda of minimizing highway/road fatalities. Implementing such road safety best practices could be viewed as a tiny step towards improving human security in the host countries. For, this matter therefore, the Hargeisa-Berbera road design project will enable me access unbiased information but also be able to apply the safest designs to save more lives both in dry and wet seasons.

2.7.2 Participant Observation

The greatest opportunity that I had in gathering field data was that; I was already a participant observer even before my company won the government-funded road design project by the same time my thesis supervisor approved my field activities. What a coincidence that my company won the same project that I was working on for master thesis! The gap sometimes unidentified by researchers is that they find themselves playing the observer’s role than they participate ... it is recommended that the researcher becomes more involved in the daily lives of the people being observed (Dawson, 2009) (4th ed.). The participation of the researcher as an observer in communities crossed by the Hargeisa-Berbera Highway can get a feeling of what it means to live near the road or have their verandas separate the houses from the highway. Human lives most especially children can be at stake any time crossing the roads/highway. One can hear that accidents take place or read about them in highway safety textbooks and journals; but it makes more sense when information is captured from the victims and the communities living side-by-side of the highway or the drivers as well as the traffic police who take care of various rescues and arrests from transportation legal breakdowns and transfer the dead and injured for postmortem in nearby health facilities.

By taking some two to three hours of interacting with people along the highway being studied, the researcher could observe if drivers of trucks or smaller public and private vehicles made any calculated movements as they interact with people, animals and other objects. Fitzpatrick and Wooldbridge (2001) states that “a consistent roadway geometry allows a driver to accurately predict the correct path while using visual information processing capacity, thus allowing attention or capacity to be dedicated to obstacle avoidance and navigation.” Driver behaviours could enable the researchers to understand the cause of highway accidents that are so common along various highways in Somaliland and beyond.

2.7.3 Secondary Research

Secondary Research was one of the major methods that was used to gather relevant information from previous studies that were related with the topic under study. Dawson (2009) unveils two major and easiest places to find secondary data as libraries and internet. Much of the methodological sources were found online.

2.7.4 Focus Group Discussions

Inspired by Hudson Maxim's belief that "all progress is born of inquiry and that doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention" (cited in Kothari, 2004). Evidence-based decisions could be viewed as products of research participants. We need to apply road safety research that is scientific and objective to provide a strong information base through good reporting systems as a stimulus for implementing best practices along highways (see also, WHO, 2015). Road safety policies require that the host country become the master of information gathering all the time. For this matter therefore, three focus group discussion used as a supplementing method to capture a variety of perspectives from the road uses and the Hargeisa-Berbera highway neighbouring communities. It was anticipated that the community were more likely to share sensitive information which the traffic police would probably not share.

In this study, each focus group discussion called for a number of people together to share their own version and perspectives on the Hargeisa-Berbera highway safety. A discussion delving into managing road safety was led "by a moderator or facilitator who introduces the topic, asks specific questions, controls digressions and stops break-away; makes no person dominates the discussion while trying to ensure that each of the participants makes a contribution" (Dawson, 2002). According to a previous research, focus groups consist of between 6 and 12 members drawn from a study population of interest, and sessions generally last between one to two hours until the topic has been covered to the satisfaction of participants (Stewart & Shamdasani, 1990 in Freeman, 2006). When people of similar characteristics came together to discuss a critical road safety matter in their surroundings, each one of them expressed worries over the increasing fatalities on the ground. They were recalling and reminding each other of previous highway fatalities.

2.7.5 Experimentation method

Two years before I thought about considering my thesis in this area, I observed some parts of the Hargeisa-Berbera highway washed away by either rain water or wind erosion. As a scientist, I found it wise to carry out an experiment on the soil structure of critical points along the highway under study. In this case, soil samples were taken and tested in the Engineering Skilling Laboratory at Gollis University to find out if they are compatible with the materials intended to be applied in the design during the gestation period of the project and thesis. This was to concur with (Neville, 2007) who maintained that "experimental studies done in the laboratories tend to offer best opportunities for controlling the variables in a rigorous way, although field studies can be done in a more 'real world' environment." In case it was found out that the soil structure around the seasonal rivers is too weak to hold heavier concrete especially in designing the bridges, and therefore consideration would be prioritised to order for alternative environmental friendly materials as well as laying the deepest foundation for appropriate safety-conscious design. This kind of data gathering could be understood as an implementation of the fact that "research is done with the help of the study, experiment, observation, analysis, comparison and reasoning ... since it has to be an active, diligent and systematic process of inquiry in order to discover, interpret or reverse facts, events, behaviours and theories" (Rajasekar et al., 2013). Practically, the type of soil structure should determine the standard of dealing with highway design for safety purposes. This is to confirm that Hargeisa-Berbera highway safety does not happen in vacuum.

2.8 Data Analysis

Field data will be analysed depending on the scope and objectives of the study. At the simplest extreme, analysis will consist of comparing research participants' experiences as well as personal observations along the Hegeisa-Berbera highway and secondary sources on other road safety fragilities across the world.

2.9 Ethical Considerations

The idea of respecting the "doing no harm principle" is an obligation of every researcher in the field whose aim is to protect the research participants and enable them build rapport with him/her. For this matter, researchers must follow a given code of conduct during fieldwork. According to published evidence, "the code of ethics supplies the with details about what you intend to do with the information they give and it shows that you intend to treat both them and the information with respect and honesty" (Dawson, 2009) (4th ed.). Participants felt secure once they were persuaded that their names would be kept anonymous or their sensitive information kept confidential. In that way they felt more comfortable to share any kind of information on road safety and experiences of traffic-people interaction. A safer field environment is not only necessary for the participants but even the researcher him/herself deserves. This is because, when the respondents in the community feel harmed or threatened by the researcher behaviour, they may harm the latter which would lead to the distortion of the research process. A bigger proportion of harm could also be extended to

institutions/organisations that might be using or interested in the evidence based data if no serious ethical measures are taken. It is the reason why “Many international agencies like WHO, United Nations bodies, UNESCAP, World Bank, Asian Development Bank, and the UN Commission on Road Safety undertake road safety research projects in specified areas and final reports are available with specific bodies (only a few are available in the public domain)” (WHO, 2015). If at all it was not the fact that these agencies want to control the viewers of their reports, all their findings would be made available to the general public.

3. DISCUSSION OF RESULTS

3.1 What is Sustainable Road Design?

Sustainability of road designs is a technical approach widely advocated for constructing resilient infrastructures. The quality of the designed roads and materials used to build them as well as environmental standards considerations determine the life cycle of the highway. It is assumed that structures built in developed countries stay much longer to an average of 80 years (UNEP Industry and Environment, 2003). In contrast, developing countries experience road sustainability challenges, Somaliland inclusive. Most drivers and people living along the Berbera-Hargeisa highway were questioning whether road designers consider life-saving possibilities for road users. The reason for this might be connected to availability of low-skilled manpower as well as limited considerations for planning highway projects. Experts acknowledge that “well planned structures built with sustainable methods and materials can be highly beneficial to the *host* communities and workers” (ibid). A highway constructed without strategic planning is a projection of future risks of increased traffic population as well as unintended road expansion budgets and environmental degradation.

3.2 Road Traffic Mortality along Hargeisa-Berbera Highway

High rates of mortality along the Hargeisa-Berbera Highway are not only a result of disease infections. For Watkins, “road traffic injuries are the single biggest source of fatality in the 10-24 year old age group, worldwide” (2012). During data collection, many emotional women lamented that their children are getting finished by car accidents. Unprecedented “numbers of people and our livestock are dying along this highway and you cannot see who has killed them, what can we do?” one man shared. One teacher was cited saying, that “the biggest problem is ... highway accidents are increasing because most drivers are not regulated by strict traffic policies, I do not know why drivers are often competing even when there is no traffic jam.” Any road or highway can be smooth but not free from accidents even in countries where they have built the best roads.

According to statistical evidence, over 60% of African are road crash victims. Pedestrian fatalities in urban areas range between 50% in South Africa and up to 90% in Ethiopia. Over 70% of the casualties are of productive age between 16-65 years ... males account for (73%) of deaths and 70% with disabilities’ lives are lost to traffic accidents (African Development Group, 2013). Tens of thousands of traffic-related deaths and injuries can have significant negative impact on countries’ economies affecting the markets of goods and services. As motorised transportation expands with increasing population, the future road infrastructures is much likely to be worse than the present situation. This necessitates road transport policies incorporating road safety standards to save more lives or road users of every age group and health status. That is why I concur with (Watkins, 2012) on the recommendation that “vehicles should be separated from vulnerable road users, such as pedestrians and cyclists and that speed has to be managed to reflect the safety features of the roads.” In addition, domestic animals should be denied freedom of unaccompanied movements along the highways but also restrict livestock farmers to use specific livestock-crossing points but not everywhere is it currently the case in Somaliland. It is difficult to maintain road safety on highways hosting overpopulated livestock mixed and increasing limitless speed often characterised with irresponsible driving.

3.3 Existing Road Designs in Somaliland

Empirical research reveals that “multilateral development banks spend billions of dollars each year to finance road building, yet systematically neglect road safety” (Watkins, 2012). It appears that best practices are not in their interest on implementation of huge highway projects especially in the developing countries. Could it mean that these bank representatives are ignorant of the countless millions of vulnerable people that are at high risk of de-bilitating injuries and largely likely fatalities? Is it in their interest really to save the vulnerable lives? There are no specific answers to these critical questions yet.

Back in the 1970s, a 10.6 million dollar project resulted into a two-lane Hargeisa-Berbera highway that was constructed in the then Somali Democratic Republic (African Development Bank, 1984). However, there are no safety measures visible along this road. There is high doubt however because the preceding renovations have not always covered the whole Hargeisa-Berbera distance of 158 Km. Cruising along this highway, you can hardly road signs at all, in most critical points that could control over speeding. A proper highway should have pavements, bus stops, zebra-crossing for pedestrians, school children and livestock crossing points among others. These signs are none existent even in the busiest city centres. Cheap things are always expensive and neither do they breed to positive results. It is unlikely that the lowest bidder who was given the contract would design a safer highway which would have been costly. The clash between the described main contractors and sub-contractors over transport rates or withdraw of work permits of 8 of the contractor's expatriate staff could have contributed to lack of attention to safety standards along this busy highway (ibid). Therefore, the major goal of constructing Hargeisa-Berbera highway of improving transportation network and planning transportation investments was insufficiently achieved. Consideration to the highest bidder would care about safer transportation of any kind.

3.4 Connection between Roads and Markets

No sustainable development can be possible without strategically designed highways. Roads play an important role in connecting trade centres. Gallal and Attier (2008) reveals that "Libya connects no less than six countries and any road through Libya can connect the middle of Africa." This North African country has been ranked by many as one of the richest countries in Africa despite the turmoil that engulf Bengazi and other Libyan regions. Regional trade is made possible with availability of well-designed roads that are wide enough to separate different lanes and limit traffic fatalities. Like all Northern countries, African countries depend on each other and therefore, import and export trade can be impossible without road transport connectivity. When people or countries share goods and services, their movements are not immune to risks. Road safety must be a public health concern and collaborating states need to care in order to maintain the promising flow of goods and services. The Horn of Africa is largely connected by road transport. Berbera port links Somaliland to the Far East, North and South. Its strategic economic importance connects all roads in the host de-facto republic. The Hargeisa-Berbera highway is so far the busiest highway in the country that allow transit goods reach the inland markets all over the country according to the research participants. With almost irreversible effects of climate change that are coupled with food insecurity as well as disadvantages of lack of international recognition, Somaliland's inhabitants wouldn't survive without trading with neighbouring countries whose major form of transport is by road. Reliable markets cannot exist without resilient roads.

3.5 Road Signs and Accidents Reduction in Somaliland

Unprecedented numbers of lives are lost annually, not just in Somaliland but around the world. Road bloodshed threatens humanity on the planet earth. Croatian highways were some of the deadliest considering the period from 2003 to 2012. The Croatian Ministry of Interior documented 574000 traffic accidents on the roads, 223000 injured people, 5590 deaths, 40000 serious injuries and 177000 minor injuries on road travellers (2013). Iraq was also statistically visible in the outstanding road accidents danger (see, Hussein, 2013). While road accidents continue to accelerate traffic related fatalities, traffic signs are largely neglected where they exist by most of the vehicle drivers as well as official authorities (ibid). If one could imagine significant numbers of developing countries designed without street signs, mankind might be undeniably shocked by double or triple highway/road deaths compared to the Croatian experience. Living examples of highway/roads accidents are largely not uncommon in Somaliland. Some two men who participated in the in-depth interview cited corruption of traffic officers along the high way, saying that "if you have money in the pocket, you can drive in any way you want and no one will touch you but you make a small mistake in the highway when traffic officers are watching you, you may end up in the university of understanding, ..." they were referring to the prison. School children and all other pedestrians are exposed to high traffic risks that are fuelled by absence of street signs and irresponsibly untrained reckless drivers driving in the shelter of traffic lawlessness. Roadway traffic signs and empowerment of traffic officers as well as stringent driving rules regulations need to be incorporated in road construction policies to mitigate the increasing numbers of fatalities to save mankind.

3.6 Estimating Bridges Construction Costs on Highways in Somaliland

Most Somaliland Engineers in field consider their country to be lacking a cost estimation tool for fixing their bridges. Cost estimation for bridge construction projects is a global gap. Data on bridges construction costs is highly insufficiently documented in African countries, meaning that accessing it is less possible. This view agrees with previous researchers'

study of 258 transportation projects around the world in 20 nations in Europe and America from 1925 to 2000 where cost underestimation was expected not in these countries but to be more pronounced in developing countries (Flyvbjerg et al; 2003 in Akoa, 2011). A combination of absence of cost estimation experts, financial incapacitation, neglect of highway safety standards in the national road policies, non-consideration of culverts and bridge designs and their construction pause major highway risks resulting to unhelpful road characteristics in most developing countries. Under-estimations on costs could be a result of shortage of cost-estimation road construction engineers but also limited budget allocated for highway project designs and construction. This is not only an African or developing country problem because, United States of America whose engineering services could be ranked efficient and effective, 25.9 % of their bridges exist in worrying state and thus calling for significant bridge repairs or replacements (see, Jia et al; 2015). Therefore, decision makers on any bridge construction projects need to consider need to have an appropriate cost estimation tool capable of handling construction, indirect, agency cost and user costs as an important component to answer questions regarding bridge construction approaches. Conser Construction Company in which I serve as Project Manager has over 10 years of successful Bridge cost estimation and I think Somaliland government could be a potential beneficiary in fixing all the Hargeisa-Berbera Highway Bridges.

3.7 Highway Drainage Systems and pavement failure in Somaliland

Somaliland is described by its inhabitants as a beautiful country without a road. Driving on the de-facto country's roadways on a rainy day reminds you how drainage systems are important for reliable transportation. Singh et al., defines highway drainage as "the process of removing and controlling excess surface and sub-surface water within the right way" (2014). The implication in this case is that highway design and construction can only be strengthened accompanying it with suitable surface and sub-surface drainage system. Most of the roads in Somaliland are in terribly bad conditions without surface drainage systems. A highway like Hargeisa-Berbera cannot guarantee reliable transportation and safety of people, goods and services due to faulty construction which leads to seepage of water into the road claiming a number of human lives in the rainy season. According to other highway expert Engineers, road drainage's basic objective is to reduce and/or eliminate energy generated by flowing water and recommend that "water must not be allowed to develop sufficient volume or velocity so as to cause excessive wear along ditches, below culverts, or along exposed running surfaces, cuts or fills" (Mukherjee, 2014). The flat landscape between sloppy hills which is one of the characteristics of Hargeisa-Berbera highway invites deadly floods that erode, remove moisture and weaken the same roads. Most of the public and private cars and trucks get stack in the flooded highway because they lose balance to cruise on. People movement as well as transportation of goods and services is halted for hours or days as vehicles and track engines get exposed to mechanically destructive water. Bridgeless seasonal rivers make it even worse because buses, taxis, transit vehicles cannot cross the flooded buried highways often killing people and damaging transit goods and mechanical functioning of most motorized transportation means. Drainage systems if designed along the roads have the capacity to divert water flow to the preferred direction but most importantly minimise road maintenance problems especially during the rainy seasons.

3.8 Environmental Road Sustainability

According to some scholarly materials, sustainable development is defined as "the meeting of the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987 in Thorpe and Zhuge, 2010). On the other hand, (Montgomery et al; 2015) also acknowledges that sustainability should not be limited to "environmental considerations associated with energy conservation and alternative energy generation but should be an inseparable integration of the environmental, community and society, economic attributes that need to be managed at the level of to be effective and successful." In Somaliland's national discourse, the topic of environmental sustainability is being given significant attention. Due to the expansion of higher education, Universities in Hargeisa are continuously educating young people to understand that the life of mankind is dependent on environmental protection. Non selective destruction of the environment largely reduces survival of mankind as well as fauna and flora. Planting trees along the Berbera-Hargeisa Highway could prevent the destructive erosion of the highway. The so called 'irreversible effects of climate change could be overturned in Somaliland if we protect the environment. Therefore construction policies need to incorporate environmental best practices where engineering practices should prioritize strong sustainability focus underpinning the range of environmental, economic and societal matters ... (Thorpe, 2009 cited in Thorpe and Zhuge, 2010). The point of contention is that much as sustainable construction is being advocated for every day, on local and international media, the message has less reached a wider audience. Developed countries such as United Kingdom have implemented sustainable construction strategies (see, Department of Environment, Transport and Regions, 2008 cited in

Thorpe and Zhuge, 2010). A universal adaption of such strategies as the UK's could ignite a huge determinant of minimizing the danger of climate change and increase safety standards on highways making it safer for economic advancement across the globe. Montgomery et al; (2015) also recommend that "various transportation planners, engineers and environmental scientists worldwide recognise that road systems need to more sustainable in light of finite natural resources, sensitive environmental, and limited economic resources." Much as road construction has positive effects on the economy, one should not deny its negative effects on safety and environment. Environmental Sustainability road construction guidelines could always be in place and directed to mitigating any likely environmentally destructive engineering practices in Somaliland. Environmentally approved roads are more attractive and safer means of transportation.

4. CONCLUSION

This research matters for Somaliland. There is no single week that concludes without hearing of road accident along various highways of Somaliland, and particularly the Hargeisa-Berbera high way. Being the busiest highway in the country so far due to its link with the Gulf of Eden which is a shipping station; a lot of traffic is inevitable. Heavy trucks are observed transporting transit goods/imports from Berbera Port to the rest of Somaliland regions. The high demand of goods and services from Hargeisa capital city puts life at stake with many people attracted by urbanisation advantages. A good number of people have lost their lives to road accidents along most of which are undocumented resulting from irresponsible driving in design uncontrolled highway. As we think of or pave(ing) the highways, it is important to note that road paving does not lead to reduction of road fatalities. All road users must be educated on a comprehensive road safety measures. While drivers of small cars and big trucks must observe road safety regulations, the pedestrians and all people living and conducting various activities and businesses along Hargeisa-Berbera highway need to be careful in road crossings. Both drivers and pedestrians must use the highway appropriately. Vehicles are not human but machines which can kill anyone any time so long as traffic rules are underestimated.

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