

The impact of mining freight on the highway transport infrastructure in Sierra Leone



A Discussion Paper on The impact of mining freight on the highway infrastructure in Sierra Leone
presented to the 20-22 June 2012 Biennial Conference of Sierra Leone Institution of Engineers

June 2012

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1 INTRODUCTION

For a relatively small country in comparison to other mineral rich countries, Sierra Leone is widely recognised as a highly prospective target for mining activities. It has also been acknowledged worldwide that the resurgence of the Sierra Leonean mining sector has been impressive although it has so far it has mainly focused on the re-establishment of closed mines or exploitation of previously proven reserves.

As new investment in the mining sector is now actively encouraged to ensure the country benefits fully from this, it is imperative that we also have the appropriate infrastructure in place to compliment it. The mining activities in Sierra Leone has given Sierra Leoneans much needed access to employment opportunities and in turn improving access hinges on better transport infrastructure including roads, tracks, bridges, footpaths and footbridges. Ineffective rural highway transport services are a major obstacle to economic and social development in many countries including Sierra Leone and this paper discusses in the impact of the mining sector in Sierra Leone on this.

Notwithstanding the above, the location of Sierra Leone along the West African coast provides a good communication between the country and other countries in Africa and Europe. Although the main port is located in Freetown, there are two other ports along the coast that are managed directly by mining companies to facilitate trade exchange.

2 GENERAL HIGHWAY TRANSPORTATION OVERVIEW

The location of Sierra Leone on the Atlantic coast provides a good communication link between the countries in Africa and Europe and good trade shipping routes with Asia and beyond. The business case justification for iron ore export from Sierra Leone is based on its the strategic location when compared its competitor mines in South America and Australia in terms of shipping cost to end market countries in Europe and Asia .

Although the main port is located in Freetown, there are two other ports along the coast that are managed directly by mining companies to facilitate

trade exchange. These include Pepel in the northern province used by the iron ore companies and Nitti in the south used in the transportation of Rutile. Apart from the new 126km railway proposals being developed by African Minerals linking the mines to the port in Pepel and to Tagrin at the later stage almost all other freight transport is by road.

The Sierra Leone Roads Authority (SLRA) was legally established in 1993 under the SLRA Act of 1992 and its establishment satisfies one of the elements of the Sierra Leone Government's strategy for addressing the problems of the road sub-sector. The SLRA's mission statement is: *to provide a safe, reliable and sustainable national road system for the enhancement of the socio-economic development of the country.* In effect it has been established to build institutional capacity better to plan and manage, on a sustainable basis, the maintenance, development and control of the country's road network.

Re-classification of Sierra Leone's network on a functional basis identified an 8,200Km national road network comprising primary and secondary trunk roads and feeder roads. Additionally, there are about 3000km of local roads, comprising rural roads and tracks and urban streets.

Passenger transport is equally important for the country's economy. Investments in roads have not been able to keep up with the pace of the country's motorisation leading to extremely high vehicle densities in the main urban conurbations like Freetown, Bo and Kenema. Yet even in some parts of the country with a high prevalence of traffic jams, higher personal mobility levels have aided to increase the national competitiveness and economic efficiency.

3 MINING FREIGHT TRANSPORT NETWORK

Gold, bauxite, iron ore, rutile and diamonds the key minerals that are mined in various districts of the country that are in the proximity of sections of the national primary and secondary trunk road network. The safe transportation of the mining freight to official outlets for export is key to economic development. As such the need to have in place a robust highway asset management plan that will aid the SLRA to make more informed

decisions on investment in the highway network cannot be over emphasized.

This is essential so that the interests and the needs of the communities are best served, the highways and transport service are at the optimum level, and resources are used to maximise benefits in a timely manner both now and in the future.

Iron Ore mines at Lunsar are along the Lunsar-Makeni Highway situated at Marampa Chiefdom in the Port Loko District. Lunsar lies on the Freetown - Makeni road, about 45 minutes from Makeni and 120 minutes from Freetown. African Minerals transport their freight by rail to a port in Pepel for shipment, whilst London Mining (the other concession company mining iron ore in the Tonkolili District) freight by road to barges at a port in Thofeym on the Rokel River and then on to ocean liners on the Rokel estuary.

Rutile is mined in the Moyamba District and mining freight can also be transported to the ports primarily through roads in the south of the country.

Bauxite and Iron Ore mined in the Port Loko and Tonkolili Districts can also be transported via sections of the Lunsar – Makeni - Kabala highway.

Some Gold reserves are mined at Kanga Hills in the Kenema District and whilst some Diamonds, are mined by Koidu Holdings Ltd situated at Tankoro chiefdom off South Koidu Highway in the Kenema District.

4 THE STATUS QUO – SUPPORTING HIGHWAY INFRASTRUCTURE

In the early 2000s there were 35,900 registered motor vehicles in Sierra Leone including 20,100 cars/light vans and 15,800 commercial vehicles.

Average daily traffic volumes peak from 1000 to 3000 in the Freetown area (and not surprisingly in the key link from Masiaka to Mile 91) to minimum volumes of 200-300 per day for roads such as Makeni to Kamakwie.

The main trunk roads are predominantly single carriageway of flexible pavement construction with asphalt concrete surfacing. The minimum construction width for Class A road lanes is 3m. Class A roads are designed for speeds of 80Km/h

with gravel roads designed for speeds of 60Km/h and feeder roads for 30Km/h.

There is a main north/south arterial route that links many major towns from the northern reaches of the country to the far south. This route which is approximately 300 Km. in length connects locations such as Kabala, Makeni, Magburaka, Yele, Bo & Zimmi. The West/East route (approximately 450 Km in length) is even more strategic in importance and most importantly directly links Freetown to the far eastern reaches of the country via key locations such as Waterloo, Masiaka, Moyamba, Bo, Kenema, Segbwema, Kailahun & Koindu.

5 CHALLENGES FACING THE HIGHWAY TRANSPORT INFRASTRUCTURE

Safety standards can be improved in most subsectors of Sierra Leonean highway transport modes. Issues relating to the transportation of mining freight and road safety remain largely unresolved in some mining areas of the country and the need to safety transport mining freight from origin to destination in the shortest possible time cannot be over emphasized.

Many people are killed or injured in accidents on Sierra Leone's roads annually and the economic cost of highway accidents can be in the region of 0.5 to 1% of the nation's GDP.

Various approaches to tackling safety are possible but infrastructure interventions are one of the key elements. These include addressing issues of road design and conducting safety audits. The section of Makeni/Kabala Highway illustrated below in figure 1 is a prime example of a highway in close proximity to residential communities for which the consequences of accidents can be far reaching.



Figure 1: Section of Makeni/Kabala Highway close to local houses

Heavy goods vehicles transporting mining freight can have a devastating effect on road condition and deterioration can be irreversible. A road in good condition is a safe road. That is why maintenance is another major issue for the highway infrastructure in Sierra Leone (particularly roads and bridges). This includes preventative maintenance such as sealing cracks in the road pavements, grading shoulders and clearing ditches to minimise the incidence of *wash-aways*, as well as planned rehabilitations.

Regular maintenance of roads transporting mining freight from origin to destination in Sierra Leone offers major benefits yet is overlooked in some areas this every dollar spent on maintenance and rehabilitation saves twice as much in reconstruction costs and reduced '*wear and tear*' on vehicles. The cost of delays due to irregular maintained roads is high. Between 1970 & 2000, Africa spent £100bn on roads. One third of this cost went to reconstruction because of lack of maintenance.

In 2010 the European Union contributed €23.5 million to Sierra Leone as part of its continued support in the area of transport and infrastructure.

It will be used to cover construction and infrastructure improvements work on high priority roads and bridges including the work on the Bo/Bandajuma highway 46km; the Makeni/Kabala highway 122km; the seven to eight minor bridges on the Masiaka/Bo highway and the Songo/Moyamba junction roads.

It is clear that major advances have been made over the past few decades in the provision of highway transport services in the country. There are however, indications that further improvements are

required to sustain development and to ensure a more equitable distribution of the benefits of the mining industry.

6 OPPORTUNITIES

African Minerals are developing a freight line and the Stage 1 works from the mines to the port in Pepel were completed in Q4 of 2011. The railway is now operational but train headways and travels times are not known. It is unlikely than the line is used to capacity for iron ore transport.

The railway alignment links the major towns in the northern province of Sierra Leone which include Bumbuna, the major hydro power station to Makeni, Lunsar and Port Loko. The line runs closely along the Marampa mines operated by London Mining.

We understand that the railway was upgraded to the 1.435m standard gauge rail from the previous 2ft 6in narrow gauge railway, initial reports are that the requirement to upgrade the railway for passenger transport in the region will be a proportion of the exiting investment already spent on the railway.

African Minerals Stage 2 proposals will see the railway extended to a new port at Tagrin on the Rokel estuary on the route of the international airport at Lungi. These proposals in our view present an excellent opportunity to develop an integrated and sustainable public transport strategy for Sierra Leone. A railway link from Freetown to the Makeni – Pepel route could be achieved through the re-introduction of the old railway alignment to and from Freetown to the Northern and Southern provinces.



Figure 2: The Railway Network in Sierra Leone (1970s)¹

We understand that the Sierra Leone government have been in discussion with railway development companies to re-build Sierra Leone's railway network and deliver a more sustainable and safer transport system.

However, there are key requirements to be considered in operating a railway system in a country like Sierra Leone. These will include:

- Reliability and maintainability of the system (locomotives, signalling and track)
- Training of Operatives (Drivers and maintainers)
- Sourcing of parts and components
- Safeguarding and securing the alignment
- Adequate supply of diesel fuel.

7 CONCLUSIONS & RECOMMENDATIONS

It is an unchallenged fact that our quality of life depends on highway transport infrastructure to a large extent. Furthermore, there would be very little economic activity without good transport infrastructure network serving all sectors of the national economy (including mining). The Bo to Kenema road (figure 7 below) is a good example of a well maintained section of the national highway network.

Approximately 900 Km of the trunk roads in the national road network carry mining freight from the mines to the various ports for export and the benefits to be derived from a national network of well maintained roads with fit for purpose and safe for use bridge structures are substantial in terms of reducing travel times and network reliability.

So what impact does mining freight have on the highway transport infrastructure in Sierra Leone? For starters, there is the distinct issue of the safety of other highway users. Catastrophic accidents involving freight vehicles can be avoided on the roads with improved designs of roads and requisite maintenance at planned intervals...

Undoubtedly, heavy goods vehicles transporting mining freight can have a devastating effect on road condition and deterioration can be irreversible in some cases.

In concluding it is safe to say that civil engineers are at the heart of society and should be able to influence the efficient management of Sierra Leone's highway transport infrastructure to ensure safety and reliability.

Well designed, operated and managed transport infrastructure will go a long way in maintaining the country's prosperity.

The impact of mining freight on the national highway network including bridge structures should be studied and where considered to be detrimental corrective mitigating measures should be discussed with the mining companies.

The opportunities to expand the railway network development by African Minerals from Tonkolili to Pepel should be incorporated into the national transportation strategy and when feasible to embark on passenger railway linking the major towns in Sierra Leone.

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This paper was produced and peer reviewed on behalf of Rokel Technical Advisory Panel Ltd. UK.