

REPORT

THE APPIATSE EXPLOSION DISASTER IN GHANA: AN ANALYSIS OF THE SITUATION A YEAR ON

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SECTION ONE: INTRODUCTION

Mining projects have often been associated with negative consequences for nature and communities close to the resource. The scale of these negative effects has been high, but the projects have been justified on the grounds that they contribute immensely to government revenues of resource rich countries. The revenues are made up of taxes, royalties and rents from mining (GHEITI, 2014). Mining has also been justified as contributing to employment creation and technology transfer. The benefits of mining notwithstanding, mining projects are often associated with negative consequences for communities that are within its catchment areas are dire to be overlooked. There have been debates about the negative effects of mining extending far beyond the immediate environment of mining projects (IIED, 2009), but the recent incident of the Appiatse explosion which resulted in the loss of lives and the destruction of the Appiatse community establishes beyond doubt, that the negative consequences of mining extend farther than can be imagined.

The negative effects of mining include but not limited to various forms of human rights abuses, environmental degradation in host and surrounding communities. Such violations are perceived mainly as a result of poor regulatory frameworks and enforcement of laws by the responsible public institutions and the disregard for the rights of community people by the mining companies (Leuenberger, Winkler, Cambaco, Cossa, Kihwele, Lyatuu, et al. 2021: Mancini & Sala, 2018).

Even though there are many mining related accidents that occur, they often happen on site. In the particular case of the Appiatse explosion, based on its scale provides an opportunity to highlight the issues of the impacts - potential and actual - of mining on communities. The peculiar nature of the Appiatse explosion is the fact that it occurred far away from a mine site, indicating that it is not only communities living within the mine site that are in potential danger from mine accidents. Though the Appiatse accident attracted national and international interests, the heightened public interest in the accident notwithstanding, the investigations of the conditions that led to the accident have been shrouded in secrecy to the extent that the outcomes of the report of the investigation have not been made available to the public.

Objectives

The study was designed to investigate the Appiatse accident and the conditions that led to the accident and the safety controls of the mining sector. The study examined in detail the following:

1. What led to the accident.
2. What interventions were made by the relevant government institutions.
3. Examine the relevant legislative provisions on explosive transport for mining operations and how they were complied with.
4. Make recommendations based on the findings.

Section Two: Literature review

Introduction

This section reviews literature that is related to the incident at Appiatse. The section is organised into three sub sections. The first part reviews publications on the Appiatse incident. The second sub section reviews the multiple causation theory, to explain theoretically the circumstances surrounding the accident. The third sub section reviews the major legislation governing the importation, manufacture, storage, transportation and use of explosives for mining in Ghana.

The Appiatse Explosion

On the 20th of January 2022, a Maxam Ghana Limited vehicle conveying explosives to Chirano Mining Company in the Western North Region of Ghana exploded at Appiatse, a community in Prestea Huni-Valley Municipality in the Western Region. The explosion destroyed many houses, killed 13 people and maimed scores of residents as well as destroying other properties in the community (Graphic online, 5th February, 2022). Government set up a committee to investigate the incident. The Appiatse accident occurred because of many breaches. According to the Minister for Lands and Natural Resources, key among the breaches unearthed by the investigations include failure to ensure the transportation of explosives was managed by a certified explosives manager, contrary to regulation 6(2) (a) of Minerals and Mining (Explosives) Regulations, 2012 (L.I. 2177). The Minister also indicated that Maxam, also failed to ensure that activities that involve explosives are carried out only by competent and certified persons, contrary to regulation 6(2)(b) of L.I. 2177; and also failed to ensure that the code of safe working practice developed for the transportation of explosives is followed, contrary to regulation 11(1) of the L.I. 2177 among others (Peace Fm online, 3rd March, 2022).

The government gave Maxam a \$1 million administrative fine for breaching regulations and imposed a \$5 million fee for damages, to be paid out in monthly instalments. The Appiatse accident which exposed the weaknesses and the lapses in safety controls of the mining sector is a wakeup call for immediate measures to address such weaknesses (Graphic Online, 2022; Reuters, 2022). The Reuters report further indicated that the truck was transporting explosives owned by

Madrid-based Maxam Corp to the Chirano gold mine, run by Toronto-based Kinross Gold Corporation, when it collided with a motorbike, caught fire and exploded, levelling a roadside village and injuring at least 100 people. However, Maxam company limited claims it did not breach the Minerals and Mining Regulations 2012 LI 2177 as indicated by the three member committee set up by the Minister to investigate the cause of the explosion (Oman FM online, 8th February, 2022). This is an issue of steep public interest and requires that the public should have access to all the information from the state relating to the accident especially when there are inconsistent statements from government and the companies involved. The public needs to know the cause of the Apptatse accident, sanctions applied, the basis of the sanctions, the compensation to be paid to the victims and their families where necessary. Again, the short and long term measures should be available to prevent future occurrences.

Multiple causation theory

Accidents, according to several writers do not happen by chance, they are a result of remote events that culminates in the accident (Heinrich, 1931). Multiple factors combine randomly to produce an accident. Man, environment, machine and management are the four major contributors that are likely to combine to produce an accident. All these four elements of accident causation are important. The predisposition of an individual takes risks or not, his/her awareness of surroundings and the necessary action to take in every circumstance are all critical considerations that can affect the probability of an accident occurring (Burnham, 2008). However further research has shown that it is not the individual per se, but the kind of population cohort (adolescent, educational level, income group, etc) the characteristic of the group the individual belongs to. The environmental conditions surrounding a particular action can define whether an accident will occur or not. The condition of the machine (maintenance, operating within its limits, operations envelope, etc) is also important to determine if in combination with the man and environment, can lead to an accident. The last factor, which is management determines who has been hired to operate the machine, the environmental conditions under which an action is allowed and the condition of the machine for the task being undertaken. It is management's duty to control all the other elements of operations to either prevent or reduce the risk of an accident happening. It is the role of

management to ensure that all the operations are undertaken within regulations as required by the system.

In view of this, the theory proposes the 3 E's of safety: Engineering, Education, and Enforcement. Safety engineering is the use of engineering to identify hazards and to control them. It is the responsibility of management to authorise activities to identify hazards associated with the activities and ways of controlling them. Management has a responsibility to provide adequate resources to eliminate or reduce, or isolate the hazard. Another important issue with safety is education. Staff must be educated about the hazards with the job and the safe behaviours to exhibit in every circumstance. Enforcement is the last part of the safety activities where the knowledge of the conditions under which an activity is undertaken is safe and legal, and record the process to be undertaken for every action.

Legal framework governing transportation, storage and usage of explosives in the mining industry

The Minerals and Mining (Explosives) Regulations, 2012 (LI. 2177) is the major regulation governing the transportation, storage and usage of explosives in the mining industry in Ghana, and the Minerals Commission, is the regulatory body responsible for implementation of this regulation. Regulation 1 of LI 2177 states:

These Regulations apply to (a) the conveyance, storage, possession, manufacture and use of explosives for mining, quarrying and civil works; and (b) substances used for the manufacture of explosives.

To operationalise the objectives of this LI, Regulation 2 of the LI 2177 makes the Chief Inspector of Mines the chief inspector of explosives, and the inspectors of mines, are the inspectors of explosives for the purposes of administering and enforcing these Regulations. Regulation 8 of LI 2177 requires an explosive manager of a company licensed to use explosives for mining, quarrying or civil works to submit explosives operating plans to the Chief Inspector of Explosives for approval before the commencement of the said operations. The Chief Inspector of Explosives shall upon the approval of the operating plan, issue an explosives operating license to the applicant. The operating plans are in respect of storage, transport, manufacture, use, dealership and blasting

firm operations (Regulation 9). The operations is expected to be carried out in accordance with the approved plan and any variations in the operations from the plan shall be communicated to the Chief Inspector of Explosives for an approval of the variation, before it can be done.

Regulation 12 requires the Explosives Manager to conduct a risk assessment of the entire explosives operation and to develop a security plan and a competent person appointed to be in charge of security of the operations.

An emergency response plan, is required among other things, to be drawn for the transportation of explosives (Regulation 13). This plan is expected to be activated when an emergency occurs when explosives are being transported.

On top of all these, Regulation 33 requires that any time explosives are to be transported for the purposes covered by LI 2177, the entity transporting the explosives shall give notice to the chief inspector of the type and quantity to be transported, 48 hours before the explosives are transported.

Regulation 96 requires that only vehicles approved by the chief inspector, can be used to transport explosives and Regulation 104 defines the characteristics of vehicles that authorised vehicles have to exhibit when travelling with explosives. Regulation 104 in part reads (emphases mine):

(l) has two earthing chains which are adequately bonded to the chassis and maintained between the chassis and the ground, one at the front and one at the rear;

*(m) except where the vehicle is empty, **has at each corner so as to be distinctly visible from the front and rear, a red flag which is at least four hundred and fifty millimetres square with the letter E in black superimposed in the middle;***

(n) where the vehicle is loaded with explosives, has posted

*(i) **on the two sides and on the front and the rear in red paint on a white background and in a manner that enables it to be distinctly visible from the front, rear and sides, a sign that bears the words "DANGER-EXPLOSIVES"; and***

(ii) on the rear a sign that bears the figure and words "60 km per hour";

The requirements from Regulation 104 ensure that if the transport company is acting legally, vehicles transporting explosives are marked and are visible. In the transport of explosives, Regulation 107 (2) places a responsibility on an entity transporting explosives by road to be escorted by the Police. Regulation 115 defines the distance between the convoy of explosive transport of at least 50 metres between vehicles, to ensure safety of the convoy.

Regulation 110 finally provides the procedure to be adopted by the transporter of the explosives in the case of an accident. Regulation 110, among others, requires the implementation of the approved emergency plan (1(a)), guarding and securing of the accident scene at all times by the competent person transporting it (1(b)) or the police escorting the explosives (1(c)).

Sanctions are provided for in LI 2177 for breaches. A few of them that apply to the context of transportation and handling of explosives are highlighted here. Regulation 7 states that the contravention of the regulation or any order made legally under the regulation for which a sanction is not provided

commits an offence and is liable on summary conviction to a fine of not less than fifty penalty units and not more than one hundred penalty units or a term of imprisonment of not less than three months and not more than six months.

Regulation 8 (8) also for example states that:

A person who fails to submit an explosives plan required by this regulation and regulation 9 is liable to pay to the Commission a penalty of ten thousand United States dollars in the first instance and an additional penalty of two thousand United States dollars for each day the report remains unsubmitted.

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SECTION THREE: METHODOLOGY

This study was an exploratory study to find out what caused the accident, the interventions to respond to the issues relating to the accident, the condition of the community people after the accident, the efforts put in place to help the community and lessons learnt from the incident. Respondents were purposively selected from the Prestea Huni Valley Municipal Assembly (PHVMA), the Police Service, and Minerals Commission. Community members were conveniently selected. As at the time of completing the report, the Police Service and Minerals Commission had not responded to the study.

Respondents sampled include a representative each from the following departments within the PHVMA: Development Planning, Works, Physical Planning, Statistics, Social Welfare and Community Development, NADMO. In the community, ten female respondents and ten males. One of the male respondents was a member of the resettlement site committee. Beyond these selected people, an unstructured interview process was used to collect data from other respondents in the community and adjoining communities. The narratives were analysed manually.

SECTION FOUR: DISCUSSIONS AND ANALYSIS

The incident

The incident as was recounted by the respondents showed that on the 20th of January 2022, around 12 noon, a motor bicycle had an accident and skidded about 10 metres and went under a truck travelling on the Takoradi to Kumasi highway through Bogoso at a section in Appiatse. The accident prevented vehicular traffic from crossing that section. Therefore, vehicles from the Bogoso side of the highway toward the Kumasi side and vice versa had stopped. The truck was carrying explosives for a mining explosives services company (MAXAM Ghana Limited). The motor cycle was said to have exploded and caught fire under the truck. Within a few minutes after the accident with the truck, there was an initial small explosion of the motorcycle fuel tank which caught fire under the truck. The accident and the small explosion and fire attracted both community people and passengers in vehicles who were prevented from crossing that section of the road to the scene. At approximately 12:46 p.m. there was a second explosion (Major, caused by explosives on the truck). This was the explosion that caused all the havoc in Appiatse. Some vibrations could be felt in part of Bogoso including the area where the Municipal Assembly is located. At the Bogoso Health Centre for instance, most of the ceiling in the building came down. Figure 1 is a picture of the town after the explosion.



Figure 1: A picture of Appiatse after the explosion

Source: Graphic online, 2022

A member of the community and camp management committee recounted his experience of the incident:

I was in the farm by then when I saw heavy dust; it was around 11:30 am to 12:00 noon. I didn't bother much and continued working. I later heard a loud noise but I was thinking it's a blast from a car tyre but within 3 minutes I heard a loudest noise again and this time around, with a heavy wind. I didn't know what was going on but I had someone calling me from the next farm. I run to him in his farm where he told me the town has been burnt. So I later saw his mother and sister also coming our way and they came with the same news I decided to go towards the town where I met my daughter. She told me she couldn't find her other siblings. I saw some blood on her but had to leave her and run to the town to look for her other siblings because she did not appear too hurt. I met some people on my way that needed help but I couldn't help them because my mind was on my children. I got home and found my building had collapsed. Everything was spoilt. I was actually asking everyone I met on my way whether they saw my children but their answers were no, so I got home and asked and I was told they were seen going in a certain direction so I had to follow that direction to find them. I was told they went with my in-law to one of my brothers' house in a different village so I took a shorter route to get there and I found them there, their mother and brother were not in the house so after seeing all my children, I then had the courage to go and support those who were injured and those who were dead.

From the narrative, there were a minor and a major explosion to be noted. The wind (powerful) he referred to, preceding the second major blast is actually the blast wave, that is, the shock front made up of a moving wall of highly compressed air (Craig & Jungerman, 1986). It is this wave that causes blast damage associated with explosions.

The respondent from NADMO in the Assembly recounted what led to the explosion:

Looking at the incident that happened, there were no escort vehicles ahead and behind the truck. The motorbike had an accident about 10m from the truck but slid on the road to cross the truck which run over it. If there was a proper escort, the escort would have seen it and done something about it.

The Development Planning Department respondent noted that:

Before the incident, the community could have been protected in the sense that per the laws such explosives carrying trucks are not supposed to travel alone. They have to go with escorts, thus one in front and one behind so if this were there, the incident would not have happened because the one in front would have even blocked the tricycle from getting closer to the explosives truck.

The two narratives corroborate information that most of the respondents confirmed that the truck was not escorted by any security vehicle, in contravention of the law. This highlights the importance of escort vehicles and competent persons being present during the movement of explosives to protect innocent persons from such calamities. The fact that such provisions were not in place became a major safety gap and exposed the community and passers-by to the hazard and subsequently, the accident. Between the first accident involving the motorbike which caught fire and the explosion of the truck carrying the explosives, what happened? These are tangible questions to answer because the narratives indicated that the difference in time was about 40 minutes.

The second explosion caused a crater in the road of about 30 feet deep. The effects of the explosion are still visible about 500 metres away from the blast point. One respondent (Works Department) submitted this on the effects of shrapnel from the blast:

Yes, it travelled to all those places (about 500 metres radius). So we have some of the victims having these particles on their stomach and thigh and other parts of their body. After 10 months, it was only last week that they were able to remove the particles from one of victims. It's some kind of black substances. I'm sure it is a metal piece.

A male community member described the devastation the explosion had caused in the town:

Yeah, it destroyed our businesses, some were having stores, kiosks, bars, containers and other businesses, but everything was destroyed, some were left with just what they were wearing when they left their houses in the morning, they didn't even meet any of their belongings, they were left with nothing. Someone like that may not be at peace even though there is something here to eat and get satisfied.

The incident required that there was emergency effort to be put in place to respond to the crisis and to ensure the safety of both lives and property.

Emergency response

From the respondents from the Works Department of the PHVMA, they felt vibrations in the office building followed by a loud bang. They attempted to follow the direction of the sound to find the source and the reason for it. They later had information that there was an explosion at Appiatse. The distance between the town and the Assembly building is about six kilometres, as the crow flies. Therefore, for the vibration and sound to be felt so strongly over six kilometres away, speaks to the power of the explosion. The official time of the explosion was 10:45 am. Within some few minutes of the explosion, the Ghana National Fire Service, Police Service, National Ambulance Service, National Disaster Management Organisation, other security services and the Municipal Assembly converged in the town to lend a hand in the emergency. According to the official of NADMO, emergency vehicles from the GNFS, National Ambulance Service, the Police Service and the Military started arriving at the scene. Ambulance from other parts of the Western region and some parts of the Central region went in to support. The affected people were rescued and more than 300 people were sent to various hospitals. Due to the number of people that got injured and needed blood transfusion, there was a shortage of blood in the hospitals so donors were organised to donate blood to the various hospitals. The respondent from NADMO recounted some of what happened after the incident:

The victims were sent to the various hospitals around us, it was only Prestea that because of the nature of the road we couldn't send people there. Tarkwa, Akropong, Komfo Anokye teaching hospital, someone was even flown in a helicopter to Korle-Bu and other places. We started going around checking on the victims. Throughout the week ambulances were around, ready to ensure the safety of the people. The Municipal Health Director Mr Kwame Samson did a marvellous work of which he is still doing. About 80 victims got injured but about 40 were severely injured, some of them underwent surgeries, one of them Paul Asare underwent his third surgery but did not survive.

Some people died instantly when the incident happened. Others died during treatment at hospitals. One male who was severely injured, and underwent several surgeries died later and was buried in October 2022, at Apowa near Takoradi. The official count of the dead was 14.

The total population of Appiatse was 1,036, with about 260 being children. When the incident happened there were 19 pregnant women in the town, one of them had a miscarriage but the rest delivered uneventfully later, with one person giving birth to twins.

In the evening of the day of the incident, and after the injured had been rescued, the issue of relocating those whose houses were destroyed arose. The MCE spoke to some leaders in the district and a Catholic priest offered their parish hall to be used to house the displaced. That night, about 962 people were housed in the parish Hall. The following morning the males were separated from the females and taken to a hotel called the Golden Hotel, leaving the females in the parish hall. They were in these accommodation for about two weeks until they were moved to a camp with tents.

An uncompleted and abandoned resettlement site belonging to Future Global Resources (FGR), a gold mining company was offered to the Assembly to relocate the affected people. The resettlement site of FGR was originally planned to be used to resettle Dumase to allow for mining of that town but the mining company folded up and the place was abandoned. The Ghana Red Cross Society (Swiss Red Cross) offered the Assembly 19 camping tents (which could accommodate 6 persons per tent) to be pitched to house the displaced people. Goldfields Ghana Gold Limited also donated 10 long tents they had used as part of their quarantine infrastructure during the COVID-19 pandemic responses. These tents were larger and could accommodate 26 people. The Food and Agriculture Organisation and UNICEF later donated 40 and 10 tents, respectively. All the displaced persons were finally accommodated in tents at the camp. This process took about three months to complete. People who had relations around were advised to go and stay with them so as to ease the pressure on the camp and its facilities.

Before the tents were erected for occupancy, there were some ground works done at the place, according to a Works Department respondent:

Though tents are usually used temporarily on bare ground in the bush, the current situation demanded that the people were to be housed in the tents in the camp for a relatively long time. The Municipal Assembly had to prepare the base with concrete before erecting the tents on them.

Almost all the people lost every household item they had; others had also lost their capital and businesses. They were also traumatised. The Vice President of Ghana visited the scene on the 21st of January with mattresses, blankets and other stuff which formed a basis for the recovery. NADMO fed the community the first week with three meals a day. They were fed from donations from individuals and corporate entities. Thereafter, NADMO started giving them coal pots, food, and other things to start reorganising their lives. Several professionals, religious and political leaders went to offer their support and counselling to the community. These included counsellors, Muslim and Christian leaders, and teams of medical officers and other staff.

Relief Response

The Prestea Huni Valley District lies in the evergreen forest region of Ghana, rainfall, thunderstorms and their associated winds are heavy. In the tent camp, incidents characteristic of this ecological zone provided an impetus for action from the Assembly. The NADMO official captured the situation as:

Settlements with the tent is over now and with that it took about 3 months to settle everybody, but within that time we experienced some wind and rainstorm at the campsite which was a bad experience. This quickly drew the attention of the leaders to have a discussion with the FGR because they were having some abandoned project.

The Assembly, upon realising the situation of the victims living in the tents, had to scout for a more permanent place for the people to dwell in because the tents could not last. An abandoned resettlement site for a mining company called FGR was identified by the Assembly and the Assembly approached the company for a possible release of the site for the displaced. The company released the site to the Assembly. However, most of the structures were at the roofing stage and the Assembly organised resources and roofed them. Some of the families were moved into temporary but completed houses after two months of living in the tents. As at the time of data collection in November 2022, it was estimated that at least, 17 of these houses had been roofed for occupation, but some of the affected people were still living in some tents. There were also two uncompleted school building projects at the site. Both of these blocks were completed and one was used as a 24/7 clinic with health personnel attending to the camp occupants. The other block had

it converted to two big rooms: one for housing breastfeeding mothers and the other, pregnant women.

A female community member also expressed her sentiments regarding how living in the completed temporary homes.

They shared it to families irrespective of the size of the family; each family is entitled to one room. Although it wasn't the best it was better than sleeping in the tents. The reason I am saying it is better is that with the building, when it is in the afternoon you can still be inside and rest but with the tent, the heat was unbearable during the afternoon. They did their best although we didn't have it like we used to have before the incident, but they did their best. Now here what I will say is that it is better than where we were because, if you have some money you can start something out of it. Our plea to the government is that here is not our permanent residence; they gave it to us temporarily so the building project that was started, should be completed.

Donations from philanthropists and corporate entities were still being received, although on a much smaller scale, as at the time of data collection in November 2022, and it was indicated that all these support have been given to the community people. The distribution of the donations has not been without challenges. Because people were traumatized, it was very difficult managing their responses to stimuli. Others were also misbehaving and taking advantage of the situation and the benevolence of the donors and NADMO. The respondent from the Physical Planning Department stated that:

Since we are humans, definitely there will be challenges because of emotions. When we sent them to the initial place there were some problems like their feeding, and their freedoms were constrained. So what I will suggest is that if anything of such nature is to happen, we need to control our emotions and listen to our leaders.

Though the community was extremely grateful to the state and to all philanthropists who came to their aid, a male community member explained their situation in this quotation:

For what happened, People lost their life, properties were destroyed and our cost of living hasn't been easy. The situation we are in now is a very difficult one, but to be honest with you, Ghanaians have love. From the first day, Ghanaians have really been supportive, but

we know how Ghanaians deal with issues, they turn to show love right after the incident but turn to relax with time. In all Ghanaians have really done well. They supported us with food, clothes, and so on.

The Prestea Huni-Valley Municipal Assembly after the emergency response, began the process of relief response by tasking the Works department, Statistics office and the Physical planning department to take an inventory of the affected houses. This was to allow for a database of the people, houses and other resources that were affected which was to be used to plan the regeneration of the town. A comprehensive database on all the affected houses, the types of houses, the level of damage and the names of the owners was developed. The beginning of the project was however delayed for about nine (9) months until in November of 2022, the town (site) was cleared of debris to pave way for the reconstruction of the devastated town which is expected to be completed in June, 2023.

Though the rebuilding process is progressing smoothly, there were a few challenges with the planning stage. The zonal planning of the new community was done in Accra and when the plan was brought to the Municipality, it was realized that a waterway was zoned for residence, so the plan had to be redone at the Municipal level to relocate that portion away from the river. Figure 2 is a picture showing the reconstruction site with the foundations of ongoing buildings.



Figure 2: A picture of the town with reconstruction going on.

Source: Field work, 2022

With all the efforts that went into the emergency and relief response, the respondent from the Physical Planning Department summarized the situation of the camp community as:

Staying in your own home will not be like staying in a camp. Although leadership did a lot of plans and arrangements for the people to, at least, enjoy their comfort as much as possible like their homes, it wasn't like that. Although they had a lot of recreational centres at the camp, just as I said, the feeling is not like you living in your own home. Those who had their farms and job close by still go to farm and return to the camp. For those who were injured, they were the people that had a break in their opportunity to go to work.

To ameliorate the sufferings of the community members, the state, philanthropists, and ordinary Ghanaians have shown so much support. For example, state and corporate basic schools in the area have waived fees for children from the community. A male community member respondent explained further:

To be honest with you, after the incident most schools aside the private schools don't take school fees from us. Where this child is now, we don't pay school fees. It is good to be honest because this conversation may reach somewhere and will go a long way to disgrace the school if I'm not honest about the help they have given us. You might have heard the name of the school, it is called Golden star. Golden Star Resources is not in existence now but the school is still there, the company used to handle the school but I heard the government wants to take over. Because of the incident, children from this community through the help of the assembly man attend the school without paying school fees, the only thing we have to do is to provide school uniform, books, of which by God's grace we still have some unused books because every term, the assembly provides books for all the children.

Though the support from the state, philanthropists and ordinary Ghanaians was very much appreciated, there was still room for improvement in the situation of the affected community. A female community member explained further on this point:

Yes we had a lot of aid after the incident from NGOs, individuals and government but the only money we received as community members for going through this tragedy was GHC 200 that was given to every member of the community including children. If I may ask, if

your relative is in trouble and you want to help, will GHC 200 be okay? If one has 10 children, that person gets GHC 2000 although its money but it is not enough. For me I could make something meaningful from this money but others cannot, because it was given to them to be used for feeding. For me I will suggest that the next time such an incident occurs, they should gather the community or even women and ask them what they need in their lives for them to be okay. There should be a bit of training on livelihoods and how to create more from little. Some families used their money to buy refrigerators and it is what provides for them now, but some too can't even account for how they used their money.

Facilities provision

The Assembly respondents explained that the state had taken it upon itself to provide houses for all the residents who lost theirs and to repair those whose houses were only damaged, not destroyed. A census of the destroyed and damaged buildings have been taken by the statistics and Works Departments of the Municipal Assembly and house owners will receive buildings with the same number of rooms they lost, but with better building materials (brick) as compared to the landcrete they originally had. This census had to be done to give information to the Assembly about the work that needed to be done; to ensure that everyone who lost a building was given what they lost and to prevent people from claiming what they did not deserve. A quote from the respondent from the Department of Social Welfare and Community Development depicts the apprehension of the Assembly regarding the motives of the possibility of charlatans taking advantage of the state:

Some people moved from various places claiming they had buildings there and saying that is their home town. You know a lot of Ghanaians are corrupt; yes they are from there, even the chief can testify but even if they don't have buildings, they will claim they have.

To ensure a smooth running of the reconstruction of the town and to avoid the perception of the possibility of people gate crashing the reconstruction and replacement of buildings, the Assembly needed to do a participatory census involving representatives from the town. The town had a section where the houses were mainly 'mud' houses and some section had block houses. The section with the mud houses had all the buildings destroyed by the explosion. and this made it very difficult for the Assembly to collect accurate data on sizes of buildings and numbers of rooms

in the houses. The Assembly asked for representatives from the community and they went round the area of the community with them identifying the collapsed buildings. The community representatives showed the Assembly staff where buildings, shops, stores etc used to stand, the size (footprint), the number of rooms, and the landlords.

After the field data collection, the Assembly staff and the community representatives then called the landlords one after the other to validate the data collected from the field. A respondent from the Statistics Department of the Assembly explained the procedure adopted for the census thus:

For instance assuming they gave me the landlord for this structure as Mr A, we called Mr A and asked him about his house and the number of rooms in it. We then confirmed the number of rooms; you could not lie because the other community representatives were there. For some people, their buildings had already collapsed before the explosion but initially, they claimed they had structures and rooms in there but later when we used the representatives and the validation process, they could not sustain the lie. Initially when we went there without the validation from these community leaders, we had huge numbers of landlords and rooms but when we had the community leaders all those numbers started reducing.

The addition of the community representatives and the validation process ensured that the data captured was a true reflection of the reality before the explosion. The minimum number of rooms was one and the maximum was eight bedrooms. In addition to these, the new town has proper layout planned for it with proper road network, portable water, electricity, educational facilities, entertainment facilities, market, health centre, and a museum. A respondent from the Works Department of the Assembly noted that:

And again when you look at the structures that were affected most of them were mud houses. But the buildings constructed with cement blocks were not much affected, so we have improved upon the material that was used so as to strengthen the buildings.

Donations have still been made to the Assembly to help them in their reconstruction effort. A male resettlement committee member noted that:

About two weeks ago, some people came to donate; I've forgotten the name of the company. They came with 3,500 bags of cement. Another group has promised to donate 3,000 bags

of cement tomorrow (Wednesday) to support in building houses; so far Ghanaians have really done well.

The town hitherto did not have a proper market place and the school they had was in a state of disrepair and was not in use. Pupils used to travel to Bogoso or other nearby towns to attend school. The new town is to be provided with a KG and a six unit classroom block.

In the allocation of the buildings after the reconstruction, because of the fact that there was now a layout, and more social facilities, it could not be guaranteed that buildings could be built at the same places they used to be and that neighbours were going to be the same. There was also an indication that there is going to be social engineering at the end of the period. The resettlement committee member stated that:

No please. As for that you won't get it like that. Even with the one we shared, we had to analyse situations and see who and who will fit living close to each other and other things. So we shared the building according to people's behaviour. We assessed all these things before sharing the building. Also they give all buildings numbers so it can be possible that your building which was close to the road side can be far away when they are done. No, the people won't complain. Now as we speak I can't even tell you where my building is, unless they are done. And even when they are done we have to sit down and analyse according to the individual behaviour for peace to prevail in the community.

The biggest challenge facing both the emergency and relief responses on the part of the state institutions has been finance. The state absorbed all the hospital bills for the injured; but the transportation to and from hospital and cost of other prescriptions which could not be provided by the hospitals still remains a challenge.

The acquisition of extra land to accommodate the expanded village and how this may affect people who originally used to farm this backyard lands is another issue that came up. The Development Planning Department respondent raised this concern in the following narrative:

Another issue has to be with land. If you go to the site now they will occupy more spaces than where they were occupying previously, because the structures that are being put up with all lanes and other facilities too. So, all the lands will be lost because of the relocation.

From the narrative, the old town with its unplanned nature and inadequate infrastructure occupied less land, but with the town now laid out the area to be occupied has increased demanding that more land has to be converted to estate land. The situation of rezoning the town, originally done at the national level, was rezoned again at the Municipal level to accommodate the river (and its associated wetland) also adds to the issue of more land now required to house approximately the same number of people as previously.

Rights interruptions

The incident, and the aftermath response, seriously disrupted the rights that the people in the community had. In discussions with respondents, several rights were perceived to have been infringed upon by the incident and its aftermath activities. The first right is the right to life. Another right infringed upon by the incident is the right to good health. The people who were injured by the blast have had their health impacted negatively and that constitutes an infringement on their rights. Other rights curtailed include the right to work and a livelihood. This issue is of two fold. Of the community members who were injured, their ability to engage in work to secure their livelihoods had been seriously impaired affecting their right to work and livelihood. The other side of this issue is the people who engaged in business activities in the town, including trading, and provision of services, have also lost their rights to a work and livelihood. After the incident, when the people were moved to the camp grounds, there was stricter regulation of people and some felt they did not have their free will to do what they were initially doing at their old place. They therefore felt that their right to freedom of movement had been diminished. The fact that people lost their homes they felt their right to adequate housing has been affected. The respondent from the Department of Social Welfare and Community Development stated that:

As a citizen of a country, we all have the rights to know where to lay our heads but what happened took that right away from them because they were sleeping in a tent which they were not comfortable with.

For the time that the people were living in the tents, they were not able to cook; therefore they were served food by the site management committee with food donated by philanthropists, corporate entities and government of Ghana. They were fed with foodstuffs based on what was

donated so they ate what was provided them and not what they liked. There are three main aspects of food security. These are availability and quantity, nutritional status and preference of the consumer. All these three factors have to be satisfied to ensure people are food secured. People's right to food security was seriously impaired as they did not know of when their next meal was coming from and more so whether it was what they wanted to eat. The respondent from the Development Planning Department captured the issues of right to food and food security in this quotation:

You cannot live your lives as you wanted. For instance the community people were offered what was available and not what they wanted. Also. The times that the people wanted to eat was affected because one could not determine what time the food should be served. Preference for certain foods was not taking into consideration.

A resettlement committee member illustrated the reality of the people living under those conditions as:

Concerning our life issues, we have been eating rice continuously to the extent that this man here turns to throw up when he sees rice. Where we find ourselves now is not where we can actually work effectively to earn something although we're trying to do something. There is so much suffering, financial difficulty and life has not been the same as it was.

A further right infringed upon and which was raised by the respondent from the Department of Social Welfare and Community Development was the right to privacy. The respondent noted that:

Even married people were separated from sleeping together due to the size of the tent. The right to consummate was also infringed upon.

The respondent from the Development Planning Department noted that people were put in a camp in tents for over three months and they did not have any private space. The respondent noted that:

Normally when such an incident happens, their privacy will be affected because they had to move and settle in a mass location where everybody was.

A major right that was violated in the Appiatse incident was that the state and the industry have not been transparent and accountable to the citizens. Although the Appiatse accident attracted national and international interests, the heightened public interest in the accident notwithstanding,

the investigations of the conditions that led to the accident have been shrouded in secrecy to the extent that the outcomes of the report of the investigation have not been made available to the public.

Lessons learnt

What happened in Appiatse on the 20th of January 2022, though unfortunate affords us (country, community, individuals) an opportunity to learn lessons for our sustainable development. The first major lesson mentioned was that the Minerals and Mining (Explosives) Regulations, 2012 (L.I. 2177) has several provisions governing the transportation of explosives for mining purposes in Ghana. Some of the provisions regulate the container in which the explosives is to be transported, the kind of truck to be used for the transportation, the inscriptions on the truck, the actions to be taken by the crew of the transport if they have to stop for anything, and the types of escort to use, among others. Unfortunately, in this particular case the truck in question was destroyed in the blast and was not available for some of these visual observations to be made by non-technical people. However, it was clear from news reports and eye witness accounts that there was no police escort, a requirement by law. Some of the respondents contended that if the explosive carrying truck had been escorted by security vehicles, the explosion might have never occurred. Moreover, even if the accident had happened, the escorts could have also prevented the massing up of people near the incident when the accident occurred, saving a few more lives.

A respondent from the Works Department noted it this way:

Then as a nation we have laws, so I believe if the logistics company had adhered to the laws concerning transportation of explosives, these issues would not have happened in the first place. Because we heard there were no police escorts of the explosives truck.

Therefore, the first and major lesson is that laws and regulations on importation, transportation, storage and finally, usage of explosives and indeed all mining activities should be enforced and adhered to *stricto sensu* because they are there for good reasons. There is a wider application of the lessons learnt to other sectors of the economy. The NADMO respondents stated that:

Nowadays how they transport their goods has changed because it is led by an escort and I'm a witness to that but there are other companies who still transport goods like acid

*without escort (***** Logistics) this same company had one of their workers as a victim of the incident and he is the person who was severely injured, they spent a lot of money, but still lost his life. They still haven't learnt anything from it. The country has to get a proper law that governs how goods are to be transported.*

There was evidence that companies use security services to escort the transportation of explosives, however the practice is not widespread. During the field visit, the same logistics company named by the respondent was observed to be transporting concentrated acid in square plastic drums on open trucks with no escort. Some concerns arising from the observations of the researcher on the field which needed to be raised include the following:

- if the accident is to occur in a populated area, what would have been its impact on the people?
- how will the affected people be protected?
- will there be emergency treatment to prevent burns and to treat them?
- how will damage to property be prevented and how will an environmental catastrophe be prevented?

The pessimism associated with the lessons that were or could be learnt from the explosion, and especially of the wider application of the lessons, is captured in the following quotation by the respondents from the Development Planning Department:

I will say there are lessons that we ought to learn but as usual of us we don't learn anything, because recently an incident happened in town where the logs on a truck off loaded and fell on a taxi and a life was lost. Did Appiatse not give us any lessons? Because we have the barriers on the road but checking to ensure that the right things are in place are not done. This is typical of us.

The same sentiment was expressed by the respondent from the NADMO as captured in the following quotation:

After the incident I will say ordinary Ghanaians have not learnt anything from it. Just last Saturday a timber vehicle's brake failed, we were lucky only one person lost his life but it destroyed three other vehicles. How goods transporters transport their goods has not been worked on and there should be an improvement. Ghanaians have not learnt anything

because last Saturday's incident, even moving the accident vehicles was a problem because traders and buyers were not willing to move away from the pavement where the accident vehicles were to allow us move the vehicles away.

The Ghanaian population has not been sensitised enough on the dangers associated with accidents involving hazardous and explosive materials. The tendency therefore is for people to drift to the accident scenes and to be the first person to capture the incident on social media. This call for sensitisation and awareness creation among the population to protect their lives and the lives of others. The fieldwork suggested that had people not moved to the accident scene after the initial vehicular accident and the subsequent minor fire from the motor cycle, the second and major explosion might not have affected so many people with so much impact. A respondent from the Physical Planning Department of the Assembly explained it this way:

When the accident happened and the smoke started coming out, a lot of people went there to observe. Also because it is a highway all the people who got there wanted to watch what had happened. Community members also went there that was why there was a huge damage. For me I see that no one can stop an accident. But I will say that we need to be careful as individuals, we have to be conscious and careful about certain things.

The respondent from emergency response organisation captured the view in this narration:

We can't boldly say an actual number of people who died because some died and we couldn't get their bodies to bury, some of these people were affected because they were going to take photographs. The person who was taking Facebook live videos has not been seen till date. The government needs to train a special emergency response coordination team in areas where there are heavy industrial activities like mining. It will be prudent if we get one in Bogoso because we are a mining district and for that matter, these incidents are prone to happen so there should be one stand-by car which we can use for emergency.

SECTION FIVE: CONCLUSION AND RECOMMENDATIONS

Conclusion

Although the initial accident, occurred as a result of a motorcycle sliding into a truck carrying explosives which led to an explosion of the truck, the failure of several actors in the chain of transportation of the explosives escalated the impact. Had the company acquired escorts to the truck carrying the explosives, which is required by law, the explosion may not have happened. The failure of the company to ensure that the transportation of the explosives was in the company of a competent person, as required by LI 2177, the initial fire which set off the explosives might have been put out, saving the situation. In view of the failure of the company to travel with the escort, a question that arises is: was there no police barrier between the point of departure and Appiatse? The weakness in the enforcement of requirement by LI 2177 was a major contribution to the accident occurring. The provisions of the LI 2177 make it mandatory for vehicles transporting explosives to be marked with a clear red sign indicating EXPLOSIVES and the use of red flags on the vehicle to make vehicles carrying explosive easily identifiable by security agencies and other road users. Assuming all these were done on the truck, the Appiatse explosion that has imposed so much pain and suffering could have been prevented.

The state agencies acted swiftly to intervene and that is commendable. The government began with the call to the emergency by the security and emergency state agencies to site on the fateful day: Police, Military, Fire Service, Ambulance service, NADMO, PHVMA, and other, non-state agencies which provided emergency assistance to the community. These notwithstanding, there are still major issues of concern associated with the rebuilding of Appiatse community to normalise life in the community. The concerns stretch from

- trauma,
- loss of livelihoods,
- loss of properties including homes
- loss of lives
- social and cultural disorientation of community people
- loss of dignity for the people who are now dependent on the benevolence of others

Undoubtedly, the people of Appiatse have their socio-cultural, economic, civil, political and environmental rights violated and need to be promptly and adequately compensated. The fact that community people residing in their indigenous environment had been displaced and continue to live on charity and at the mercies of others require the immediate attention of the state. As at the time of data collection, there was no talk of compensation to the individuals who lost all their properties and in some cases their lives as a result of the explosion. The people of Appiatse continue to live in misery whilst MAXAM and the company they were conveying the explosives to continue with their operations. It is on record that though the company had been fined by the state, this notwithstanding the community members who are alive had only received 200 cedis per person. The state has indicated its commitment to rebuilding all the buildings destroyed, renovate the damaged houses and had actually started with the reconstruction which is expected to be completed in June, 2023. Such arrangements mean that the people of Appiatse will continue to survive in temporary structures including tents. This also means that the people cannot enjoy the family lives they were used to back in their hometown before the accident. This is a major challenge that erodes the dignity of the people of Appiatse.

Though the laws have adequate provisions for the safe transportation of the explosives, the regulations failed to provide for strict liability for the cost of an explosion arising from the failure of a company to comply with the regulations. The laws also failed to provide procedures upon which a person injured as a result of the explosion can claim compensation from the company that caused the explosion.

Finally, the community members were looking up to the state to provide them with some money to be able to start some business and livelihood activities after they have gone back into their own homes in the reconstructed town. The resettlement site committee member captured this in the following quote:

Right now, it all depends on money, government might build our houses for us but I'm not sure he will be willing to give 1,000 Ghana cedis to each one to work with. Yeah, so for now everything depends on money. Because, if you give the person food without money, it's still going to be difficult for them. Our wards are in school, we pay school fees, bus fee, canteen fees; each morning I spend almost 50 Ghana cedis if all the 3 kids go to school.

Recommendations

At the end of the study, the following recommendations are made for various stakeholders and potential stakeholders to avoid the occurrence of these accidents and to reduce the destruction, if something like this ever happens again:

1. Companies working in all sectors of the economy, and in this case mining and support services, must follow all regulations and legal requirement in undertaking any operations. Such regulations and laws are there for good reasons.
2. The requirement of the presence of a competent person is necessary for instance; in the case of Appiatse this person could have put the initial fire under control possibly preventing the second explosion.
3. The state should set up, especially in areas of high extractive and industrial activities, an emergency coordinating unit with the District Assembly set up to be responsible for emergency response. This unit should be trained and given resources to be able to respond appropriately, to emergencies in their jurisdictions.
4. The state should create awareness on the dangers of explosives and how citizens should conduct themselves in similar situations.
5. The LI 2177 should be reviewed to include a provision for strict liability for a company that failed to adhere to the provisions of the regulations resulting to an explosion that cause injury to people such as the present case (Appiatse).
6. The LI 2177 should also include procedures upon which persons injured as a result of the explosion can claim compensation.
7. It is also recommended that persons injured as a result of the explosion take action(s) in court to claim damages for the negligence of the company for the injuries they sustained as a result of the explosion.
8. Living in tents are temporal measures in situations of disaster. For community people to live in tents for close to one year places a lot of hardships on the lives of the victims and affect their dignity as human beings. Even though the initial preparation of the site alleviated the environmental conditions in the camp, the whole tent camping is not conducive for long term dwelling especially in rain forest regions. It is recommended that temporal measures in disaster situations should remain temporal and not stretch beyond

two months. The fine paid by the company to the state should have been used to fast track the reconstruction of the Appiatse community.

9. The peculiar nature of the Appiatse explosion is the fact that it occurred far away from a mine site, indicating that it is not only communities living within the mine site that are in potential danger from mine accidents.
10. The victims of the Appiatse community should be adequately compensated as a matter of urgency for the loss of lives, properties and for other rights violations.

References

- Burnham, John C. 2008. The syndrome of accident proneness (Unfallneigung): Why psychiatrists did not adopt and medicalize it. *History of Psychiatry* 19(3):251–274.
- Craig, P. P., & Jungerman, J. A. (1986). *Nuclear arms race: Technology and society* (pp 461). New York: McGraw-Hill.
- Ghana Extractive Industries Transparency Initiative (GHEITI, 2014). *Aggregation and Reconciliation of Receipts for 2014*. Ministry of Finance and Economic Planning, Ghana; 2011; Unpublished.
- Graphic online (05/02/2022). The Appiatse explosion and eyewitness account. (<https://www.graphic.com.gh/news/general-news/the-appiatse-explosion-and-eyewitness-accounts.html>).
- Graphic Online (8th February, 2022). Maxam asked to pay US\$6,Million. (<https://www.graphic.com.gh/news/general-news/appiatse-explosion-maxam-fined-us-6million.html>).
- Heinrich, H. W. (1931). *Industrial accident prevention: A scientific approach*. New York. McGraw-Hill.
- IIED (2009). Mining, minerals and sustainable development project (MMSD). Final report. London: International Institute for Environment and Development.
- Leuenberger A, Winkler MS, Cambaco O, Cossa H, Kihwele F, Lyatuu I, et al. (2021). Health impacts of industrial mining on surrounding communities: Local perspectives from three sub-Saharan African countries. *PLoS ONE* 16(6): e0252433. <https://doi.org/10.1371/journal.pone.0252433>
- Mancini, L., & Sala, S. (2018). Social impact assessment in the mining sector: Review and comparison of indicators frameworks. *Resources Policy*, 57: 98-111.
- Peace FM Online, (2022). Gov't Report On Appiatse Explosion Ready, But... <https://peacefmonline.com/pages/local/news/202203/461687.php?storyid=100&>.
- Reuters (February 8th 2022). Spanish firm fined \$6 million for Ghana truck blast that killed 13 <https://www.reuters.com/world/africa/spanish-firm-fined-6-mln-ghana-explosives-truck-blast-that-killed-13-2022-0208/#:~:text=The%20government%20gave%20Maxam%20a,Logistics%20to%20transport%20the%20explosives.>