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Assessing the Adequacy of the Emergency Assembly Points in Fuel Filling Stations in Ghana: The Perspective of the Public

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Abstract:

There is the need for rescue in every emergency situation. Siting of the Emergency Assembly Point (EAP) is necessary to get people converge to facilitate the rescue process. Truly, these points may seem appropriate and adequate in many institutions but is that the same for all? To find out the feeling of the public on the appropriateness of the EAP in fuel filling stations, this study, through a survey, was conducted in the Bono Region of Ghana. A sample size of 200 respondents was purposively and conveniently studied. These included customers, pump attendants and station managers. This descriptive study employed a structured questionnaire which was self – administered to pump attendants and station managers. Customer's responses were gathered through Google forms. The gathered data were analysed and presented using Statistical Package for Social Sciences (SPSS). It was realised that people are generally aware of the EAP as well as its uses. However, they felt the point was not far enough to protect them from harm in certain emergencies. They were, therefore, not ready to converge in those points during emergencies. It is recommended that regulatory bodies should spell out emergency situations that are less dangerous for people to utilize these points. Also backup points should be allocated out of the filling station where people can go on their own when they are able to escape dangers from the stations or for serious emergencies.

Keywords: Emergency assembly point, Storage facilities, Fuel filling stations, Emergencies, Survey

1. Introduction

The Emergency Assembly Point is a location where staff, workmen, visitors and people are expected to gather in the event of fire, leakage, explosion and other emergency situations (Rajput, 2020). These points are sited based on the direction of the wind and entry/exit routes to a facility. According Rajput (2020), the aim of siting this point is to gather persons in a safe place. These emergency points are necessary for every facility that houses people such as hospitals, schools, banks, warehouses, manufacturing firms and others. Prominent among such facilities in Ghana are the fuel and gas filling stations.

The filling station is a storage and distribution facility for fuels such as petrol, diesel, liquefied petroleum Gas (LPG), kerosene and other automobile lubricants. Joseph (2005) describes filling stations as any structure or equipment used to sell or dispense petroleum products for motor vehicles. These stations generate and release hazardous toxic vapors such as Volatile Organic Compounds (VOC) which consist a mixture of benzene, toluene, ethylbenzene, and xylenes (BTEX) during their operations. Filling station equipment failures can result in serious mishaps that endanger persons and property. As a result, filling station safety standards must be designed based on risk or locational analysis (Douti, 2019). Given the high risk connected with petroleum products as a highly combustible substance; its exploration, transportation, unloading, storage, selling locations and facilities must be carefully handled (Mshelia, Abdullahi & Dawha, 2015). According to the National Petroleum Authority Act 2005 Act 691(b), the operation of the stations creates risks to public health, safety or security. This has necessitated the need to set up crisis management system to curb or manage unforeseen circumstances that may happen in the future. To Amewu (2019), the goal of a crisis management system is to ensure energy sector organizations develop procedures to effectively deal with emergency situations that exceed the capacity and capabilities of site resources. This is to safeguard the safety of personnel, properties, and the surrounding communities, as well as a prompt restoration to normal operations. Safety precaution to save lives has necessitated the need to establish emergency assembling point among fueling stations in Ghana.

Several studies have been conducted on the risks associated with operations of such stations and their impact on the environment (Bello and Inobeme 2015; Mshelia, Abdullahi and Dawha, 2015; Taylor *et al.* 2016). Akuffo *et al.* (2019)

assessed the knowledge and perception of the public and pump attendants on the siting of fuel stations in Tamale metropolis. These studies concentrated on general requirements and safety measures. This study is limited to the Emergency Assembly Point (EAP) and its adequacy in protecting people from harm during emergencies in Ghana. The study is done with the concept of filling stations as storage facilities or warehouses of highly combustible substances.

The emergency assembly point is a mandatory location sited in these storage facilities. This area is visible upon entering these stations. As part of the requirements in creating these points, size of the area is considered in order to be able to contain all persons within and possible visitors of facility (Health and Safety Authority (HAS) Acts and Rules). The place must also be accessible, devoid of obstructions (HAS Acts and Rules). These points should be sited in wide open areas especially for fire. Most importantly, the assembly point should be suitably safe distance away from the facility.

The assembly point should be located far enough away from the building or facility to afford protection from heat and smoke in a fire situation but not so far away as to discourage people from using it. Fire assembly points should be in positions that do not put staff, visitors and users of the storage facility at risk from emergency vehicles responding to the incident, or from general traffic in the vicinity, therefore the Emergency Assembly Points should be located away from, and off the vehicle access routes leading to the storage facility or premises. Ideally, the fire Assembly points should be located so as not to require the crossing of a road or movement through trafficked areas.

According to Pegg (2019), the motive of these assembly points are to keep people safe in case of emergency and also to enable headcount of employees. Possible emergencies of the filling stations include fire, explosion, large flammable liquid spill, person or clothing covered in gas, injuries, threat of violence and robbery (Health and Safety Authority (HAS), 2016). The emergency assembly point is sited based on recommendation of regulatory bodies such as Environmental Protection Agency (EPA) and Ghana National Fire Service (GNFS). With the fuel and gas stations characterized by combustion and explosion which can cause serious casualties and spreading through wider areas (Zhang, 2014), it is important to get answers to some questions: are employees and customers aware of the assembly point? Is it adequate to converge at the assembly points in case of disaster? To answer these questions and more, this study seeks to examine the perception of people and pump attendants in relation to the emergency assembly point. And what form of emergencies demand converging at these points.



Figure 1: Image of Emergency Assembly Point Logo Used at Filling Stations
Source: Internet Source

2. Materials and Methods

2.1. Research Design

A descriptive survey is adopted for this study. This method employed to enable the research accurately describe the situation and how people feel about the emergency assembly point. The population targeted includes managers of filling stations, pump attendants and customers in Ghana.

2.2. Sampling

This study was conducted on a total of 200 respondents. This consisted of 91 pump attendants, 26 station managers and 83 customers. For convenience purposes, fuel filling stations, within Sunyani, were the major respondents since questionnaire were self-administered.

2.3. Data Collection

Collection of data was through a structured questionnaire. The respondents include managers, employees and customers of the filling stations. Data from customers was gathered through Google forms. Whiles that of managers, pump attendants and a few customers were self-administered which was majorly in Sunyani.

2.4. Data Analysis and Presentation

The data collected were collated using a statistical package for social sciences (SPSS). The data were analysed using descriptive statistics and presented using cross-tabulations and frequency tables.

3. Results

3.1. Demographics of Respondents

Presented in table 1 is the background information of respondents of this study. We had 91 pump attendants, 26 station managers and 83 customers responding to the questions. These respondents were made up of 118 males and 82 females. Also in terms of age, 113 of the respondents were within 20 -30 years. 53 were within 30 – 40 years and 34 were above 40 years. This indicates that discerning adults responded to our queries. The station categories captured were 168 people from liquid service station, 12 from the gas service station and 20 from stations that serve both liquid and gas.

Item	Frequency	Percentage
Respondent		
Pump Attendant	91	45.5
Station Manager	26	13
Customer	83	41.5
Total	200	100
Sex of respondents		
Male	118	59
Female	82	41
Total	200	100
Age of Respondents		
20 -30	113	56.5
30 – 40	53	26.5
Above 40	34	17
Total	200	100
Station Category		
Liquid	168	84
Gas	12	6
Both	20	10
Total	200	100

Table 1: Demographics of Respondents

Source: Authors' Construct 2022

3.2. Educational Background of Respondents

Table 2 is a cross tabulation of respondents and their educational levels. Only 2 customers had no formal education and 3 pump attendants had primary level education. 5 pump attendants had educated up to the Junior High level, while 77 pump attendants and 19 station managers had Senior High/vocation/technical education. Also, 6 pump attendants, 7 station managers and 44 customers had tertiary education. Lastly, we had 37 post graduate level customers responding to the questionnaire.

	Highest Level of Education Obtained							Total
	No Formal Education	Prim. Education	JHS	SHS/ Technical/Vocational	Tertiary	Post Graduate		
Respondent	Pump Attendant	0	3	5	77	6	0	91
	Station Manager	0	0	0	19	7	0	26
	Customer	2	0	0	0	44	37	83
Total	2	3	5	96	57	37		200

Table 2: Respondent's Educational Level

Source: Authors' Construct 2022

3.3. Awareness of the Presence of EAP

Siting the EAP is not the ultimate but getting potential users aware of it and its usefulness is very necessary. In assessing peoples' awareness of the EAP, out of the 91 pump attendants, who responded, 78 were aware, 8 were not aware of it and 5 were neutral about its presence. Ironically, among the 26 managers who participated, 8 and 5 managers were not aware and neutral respectively. With the customers too, 11 were not aware and 12 were not sure out of 83 who responded.

		Presence of an Emergency Assembly Point			Total
		Yes	No	Not sure	
Respondent	Pump Attendant	78	8	5	91
	Station Manager	21	3	2	26
	Customer	60	11	12	83
Total		159	22	19	200

Table 3: Awareness of the Presence of Emergency Assembly Point (EAP)

Source: Authors' Construct 2022

3.4. Knowledge of Emergency Means of Communication

Apart from siting the EAP, filling stations are expected to have a means to communicate during emergencies. Upon entry into these stations, such procedures are visibly displayed though not found in all stations. On enquiry on the knowledge of such procedures, 65 pump attendants were knowledgeable, 18 were not and 8 were not sure. 5 managers had no knowledge at all while 2 were neutral. On the part of customers, 39 had knowledge of the means of communication, 17 had no knowledge and 27 were neutral.

		Knowledge of Emergency Means of Communication			Total
		Yes	No	Not sure	
Respondent	Pump Attendant	65	18	8	91
	Station Manager	19	5	2	26
	Customer	39	17	27	83
Total		123	40	37	200

Table 4: Knowledge of Emergency Means of Communication

Source: Authors' Construct 2022

3.5. Accessibility of the EAP

Responses on accessibility of the EAP are presented on table 5. The essence of the EAP is to protect people from harm or further harm during emergencies. If the point is not accessible, its usefulness would have been lost. In the researchers bid to find out, 76 pump attendants attested that the point was accessible. 9 attested it was not accessible, while 6 were not sure whether it was accessible or not. On the part of station managers, 21 responded positive on its accessibility and 5 responded negative on the EAP's accessibility. 56 customers were positive, 11 were negative and 16 were not sure on its accessibility.

		Accessibility of Emergency Assembly Point (EAP)			Total
		Yes	No	Not sure	
Respondent	Pump Attendant	76	9	6	91
	Station Manager	21	5	0	26
	Customer	56	11	16	83
Total		153	25	22	200

Table 5: Accessibility of Emergency Assembly Point (EAP)

Source: Authors' Construct 2022

3.6. Knowledge of What to Do in an Emergency Situation

It is very important for everyone to be knowledgeable of what to do during emergencies. If proper education is done, every Ghanaian or stakeholder of filling stations is supposed to be aware of exactly what to do in relation to every kind of emergency that has the tendering of occurring in the filling stations. In posing this question to the category of stakeholders researched on, 77 pump attendants knew what to do and 14 did not know what to do during emergencies. 18 station managers knew what to do, while 8 didn't know what to do. 43 customers as well knew what to do and as many as 40 didn't know what to do. This defies the rules of Workplace Health and Safety Queensland, (2016) which emphasize on the need of employers to provide orientation to their new, young and inexperienced workers upon their hire or transfer.

		Knowledge of What to Do in an Emergency Situation		Total
		Yes	No	
Respondent	Pump Attendant	77	14	91
	Station Manager	18	8	26
	Customer	43	40	83
Total		138	62	200

Table 6: Knowledge of What to Do in an Emergency Situation

Source: Authors' Construct 2022

3.7. Readiness of People to Converge at the Point during Emergencies

Users' acceptance or unacceptance of a policy is important for its successful implementation. The purpose for which the EAP is sited must be accepted and used for its aim to be achieved. The study wanted to reveal if the people will actually gather at the point during emergencies. In response to that, 25 attendants were ready to converge there, while 66 were not ready to converge there during emergencies. Only 9 station managers were ready to converge at the point, while 17 did not do so. On the part of customers, 24 will converge, while 59 will not converge there. These responds indicate that, people have not fully accepted the concept of converging at that point.

		Readiness of People to Converge at the Point During Emergencies		Total
		Yes	No	
Respondent	Pump Attendant	25	66	91
	Station Manager	9	17	26
	Customer	24	59	83
Total		58	142	200

Table 7: Readiness of People to Converge at the Point during Emergencies

Source: Authors' Construct 2022

3.8. Opinions about Safety of the EAP

Respondents' opinions were sought on the safety of the EAP and in total, only 25 respondents attested to the safety of the point. A combined total of 175 respondents disagree to the safety of the EAP. These respondents are presented in table 8.

		In Your Opinion, Is the Assembly Point Safe Enough to Protect You from Danger?		Total
		Yes	No	
Respondent	Pump Attendant	14	77	91
	Station Manager	3	23	26
	Customer	8	75	83
Total		25	175	200

Table 8: Opinions about Safety of the EAP

Source: Authors' Construct 2022

3.9. Availability of Backup Converging Points Out of the Station

The study intended to reveal if stations had other assembly points outside the station. 14 respondents confirmed the availability of other converging points, 142 responded no and 44 had no idea. These responses are presented on figure 2.

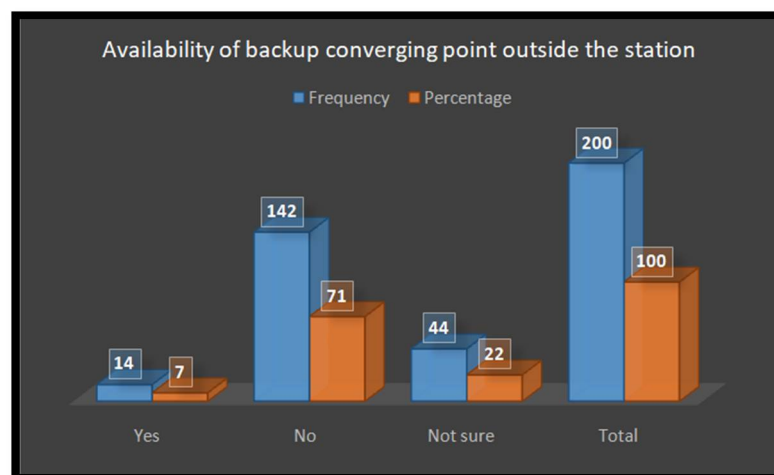


Figure 2: Availability of Backup Converging Point Out of Station

Source: Authors' Construct 2022

3.10. Distance of Assembly Point from Station

Siting of the emergency assembly point is based on the land available to a particular filling station. Due to this, some stations have their assembly points far enough from stations, while others are squeezed into the stations. On users' opinion as to whether the point was far enough from stations, 71 responded yes, 111 responded no and 18 could not judge as presented in figure 3 the Regulatory Reform order 2005.

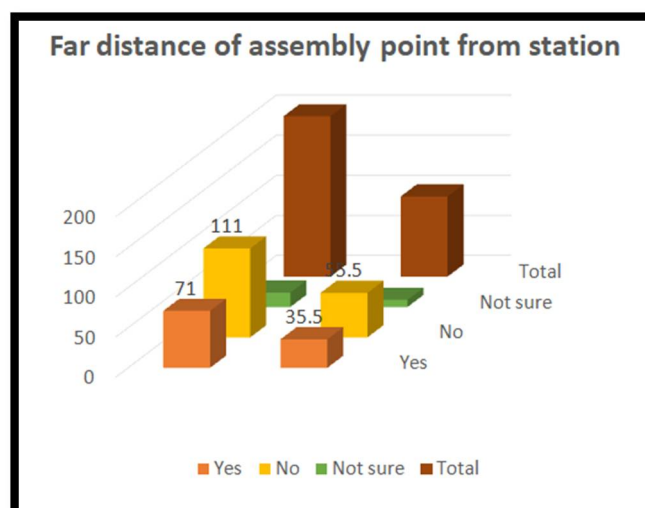


Figure 3: Distance of Assembly Point from Station
Source: Authors' Construct 2022

4. Discussion

The aim of this study was to reveal from the perspective of the public whether the Emergency Assembly Points sited at the fuel filling station were adequate enough to protect people from danger during emergencies. In doing so, primary data collected from 200 respondents including customers, pump attendants and station managers were analysed and conclusion drawn as follows.

It is widely known in Ghana that disasters are highly linked to petroleum – based businesses and their operations are common in Ghana (Ghana National Fire Service (GNFS), 2017). An aspect of safety rules include the siting of the Emergency Assembly point where people around are supposed to gather during emergencies to facilitate evacuation. During the study, respondents to the questionnaire were adults who were 20 years or more at the time of collecting the data. This indicates that respondents were discerning and responded responsibly. In terms of education, majority of the respondents were educated and therefore understood the questions posed to them.

When asked on their awareness of the Emergency Assembly Point, the presentations indicated there was high awareness of the assembly point as well its utilization. There were a few pump attendants and managers who were not aware of the EAP. This indicates that education or orientation of new workers was not adequate. This defies the rules of hazard communication (Health and Safety Authority, 2016).

Majority of the respondents were knowledgeable of emergency means of communication. This is because such information is displayed in the stations. In terms of accessibility; it is confirmed that the EAPs are accessible. However, respondents felt the points were not far enough from facilities to serve the purpose of protection. This has defeated the motive of emergency assembly points which is to safeguard people (Pegg, 2019).

People are aware, they are supposed to converge at the stations but they are not ready to do so. This is because they felt the EAPs are not safe enough to protect them from danger. Since these sites are not safe enough, it contradicts what National Petroleum Authority Act 2005 Act 691(b) stipulates, because their operations are detrimental to lives and properties.

Almost all the stations did not have other converging points out of the stations. This is against HSA acts and Rules. Regarding how emergency situation could turnout in these stations, it would be appropriate if other locations are earmarked for people to go to if they are able to get out of the facility.

5. Conclusion

There is the need for rescue in every emergency situation. Siting of the Emergency Assembly Point (EAP) is necessary to get people converge to facilitate the rescue process. Truly, these points may seem appropriate and adequate in many institutions but not in the fuel filling stations. Due to the combustible nature of the stations, the public does not trust ability of the EAP there to keep people safe during emergencies. However, regulatory bodies and stations could spell out the kind of emergencies that demand converging at such points. It is recommended that backup locations be earmarked for dangerous situations. Hazard communication and training should be a constant activity not only to employees of the station but also to people around and customers.

6. Acknowledgements

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7. Conflict of Interest

The Authors declare that there is no conflict of interest.

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