

Safety and health assessment in Kenyan petrol stations: Case study of Thika-Nairobi highway stations

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Abstract—In modern workstations, safety has been given priority to safeguard the well being of employees and structures therein. The recent outburst of flames in petrol depots has raised a lot of concern to all stake holders. Petrol stations harbor highly inflammable petroleum products such as super petrol and liquefied petroleum gas which must be handled with great care. This research sought to identify the distribution and location of petrol stations along Thika-Nairobi Superhighway and thereafter evaluate the practices and awareness of staff to safety and health regulation and determination of management physical controls to health and safety risks.

Preliminary visits were conducted to establish the exact number and locations of the stations, a questionnaire was also designed with structured questions to establish the in-depth conditions of the workplace organization, housekeeping, electrical safety, fire safety, chemical safety, training of staff in emergency preparedness, and other general observations related to health and safety. The study established that, although the employees in all the identified stations were aware of the risks to safety and the health surrounding their work environment, the level of importance attached to this by the multinational dealers was higher than for independent stations. Training on employment and continuous sensitization was only done by multinationals. This study will generate facts which the stake holders in the petroleum dealership industry can use to improve service delivery to their customers. Employers and employees could be encouraged to adhere to laid down standards to ensure that their work place is safe. The public can also be sensitized, based on the findings to be aware of the risks associated with petrol stations and to take precaution whenever they approach petrol station

Keywords—Inflammable petroleum products, multinational dealers, stake holders, petrol stations.

I. INTRODUCTION

IN Kenya, service station and filling station terminologies are used interchangeably. This refers to facilities where the core business of selling fuel to motorists and liquified petroleum products(LPG) for domestic consumption is evident. This is because more often than not, garages operate as single entities. Moreover, petrol stations have become stop over joints for long distance travelers, they house large supermarkets, cafeterias, food kiosks, hotels and restaurants, they also provide parking spaces for microbuses, transit good lorries and even motorcyclists for safe overnight rests. During the stop overs, the passengers and the workers traverse the station fueling areas where human and vehicular traffic is not designated [1]. This causes congestion of both human and

vehicle without the knowledge of the hazards associated with the petroleum products contained there.

Flammable atmospheres are prominent in such facilities due to handling practices and level of safety knowledge instilled in the workers. The safety aspects of petroleum delivery, storage and dispensing must be emphasized to tame the rising incidences of fire and explosives in the sites [2]. Other aspects of health and safety considerations are, in addition to the general duties established under Occupational Safety and Health Act (OSHA 2007), the management of health and safety at work regulations, assessment of risks arising from substances hazardous to health, reporting of injuries, diseases, and dangerous occurrences, electricity faults at work and provision and effective use of personal protective equipment (PPE) [3].

II. OVERVIEW

There is a remarkable decline in the number of petrol service stations globally. This decline is attributed to the ever rising fuel costs and recession that hit the world economy at large. Despite this downward trend the number of registered vehicles has soared in the recent past [4]. On contrary, there is a steady growth of the number of petrol service stations here in Kenya as shown in Table I.

TABLE I
NUMBER OF SERVICE STATIONS IN KENYA

Province	Independent	Branded company	Total
Central	63	82	145
Coast	64	84	148
Eastern	64	58	122
Nairobi	74	217	291
Nyanza	24	37	61
Rift Valley	104	133	237
Western	25	23	48
Total	418	634	1052

A hoard of equipment is found in the Kenyan service stations, this includes but not limited to; Fuel dispensers, air compressors, dynamometers, battery chargers, fire extinguishers, wheel balancing machine, and tire changer each performing a definite function. Due to this large list of equipment, presence of highly inflammable petroleum products and huge crowd of people both working and approaching the service stations, a danger looms in case of any minute accident [5]. Conspicuously missing is documented research findings

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assessing and evaluating the adherence of the petrol service stations to occupational health and safety legislation standards. Therefore the need to establish the prevailing conditions in the facilities and devising a way of sensitizing the public and operators at large about the safety and health issues related to petrol stations deemed necessary.

III. METHODOLOGY

A. Study sample

The study concentrated on petrol stations along the Nairobi-Thika superhighway, the then Nairobi-Thika highway. There were a total of twenty service stations along the highway. However, four of them could not be classified. The results were recorded and analyzed in Table II. The study sample entailed 100% of the total number of stations due to their small number.

B. Research tools and procedure

The research tools used were: Assessment where each service station was assessed individually and an average score calculated before comparing the results with those of the other companies. A structured questionnaire was administered by guiding the interviewees (workers and managers) and the feedback put down as understood by the researcher. For authentic results, five interviewees of each category were interviewed and an average mean score calculated to eliminate any biased response from the interviewees.

C. Rating criteria

The performance in every category of questions was rated on a percentage scale for ease of comprehending. The score was based on availability of facilities, compliance and lack of it. The categories were grouped to enhance finding in-depth condition of the work place organization, housekeeping electrical safety, fire safety, chemical safety and training of staff, emergency preparedness and other general observations related to health and safety and security. The rating criterion was devised during the study based on the understanding of the importance of safety and health in petroleum products handling environment by the researcher. Finally, in assessing the competence of the employees at the service station, effort was made to establish whether they had enough practical and theoretical knowledge, training and actual experience to carry out a particular task safely and effectively.

IV. RESULTS AND DISCUSSION

A. Petrol service station identification

The study identified twenty petrol service stations out of which four were filling stations and could not be analyzed since they did not fit the description of a petrol service station. The independent operators and the multinationals each had a 50% presence in the area.

B. Evaluation of practices and awareness of safety and health

While evaluating chemical safety, the sources of danger from oils, gases, battery acid, brake fluid and all fuels sold at the premises were considered. Further, materials storage in the right places, display of instructions for safe use, wearing of PPE by the employees and provision of wash areas with clean water was sought. The findings showed that, Shell and Total Kenya performed well, leading with a 80% followed by Kenol and Kobil with 79.6%. The others trailed the pack with averages ranging from 60% to 76%. National Oil Corporation of Kenya (NOCK) scored the least because it was operating while under construction. On the overall, multinationals outperformed the independent operators.

C. Fire safety

The employees responded overwhelmingly regarding adoption of prevention measures, appropriate installation of fire fighting, presence of warning signs conspicuous enough to draw the attention of even visitors and the presence of fire alarms and detectors. This aspect of fire was majority of stations score a 56%, a ultimate for combination of various aspect. Shell, Total Kenya, and Oilcom topped with 71.6%, 72.5%, and 72% respectively having installed very good systems, While the others took fire risks very seriously. It was noted that NOCK trailed because it was still fitting its equipment. However, there was no much variation in the regional and independent stations.

D. House keeping

The performance rating showed variation across the board with each category scoring competitively regardless of their classification. Majority of the stations scored well above 65%.

E. Dangers from human factor

The results for this category were based on assessing suitability of employees to their jobs, training about risks related to the job, incident and accident reporting and inspection and audits. The results were exemplary with all stations scoring above 70%. This meant that there was a close relationship between compliance and the aspects assessed. If not complied with, the premises would be closed and so the dealers were careful to adhere to the requirements.

F. Work organization management

Total Kenya and Shell trailed NOCK which had 73.1% with 69.8%. The rest had a score of between 55% and 65%. This was not a good trend for petrol stations. From this it was deduced that the authorities were interested in adhering to local authority requirements and legal compliance. The rest was about reaping maximum profits. The turnover of employees was also high and employment was by reference and not necessarily skills.

G. Health and safety management

For health and safety issues regarding availability of training manuals, emergency procedures, safety meetings, incident reporting wet and hardware stalk records were tackled. NOCK led the pack with 77% followed by Shell with 72.8% and Total Kenya with 70.8%. It was commendable to note the performance of NOCK right from the start and that it took safety and health seriously. The other players left a lot to be desired as they scored an average of 64.5%.

H. Vehicle services and car wash

Vehicle service and repair had issues like whether used oil is collected and stored by an authorized person, use of fire extinguishers and generally correct operation of equipment found in the service bays; availability of first aid kit and general forecourt appearance. Total and Shell scored very high with 79% while the others scored an average of over 70%. This meant that a lot of care was taken by the proprietor possibly because it was an important side revenue earner.

I. Overall comparison of performance for all petrol station

At the long run, Shell had outperformed all other stations with a performance rating of 77.54%. Total Kenya Came in closely with 77.25%. The others followed with ratings averaging between 65% and 70%, which was above average. NOCK was way below because of its construction and operation condition. Otherwise from the information available in their web site, one would expect a better performance compared to the other players. It was however assessed because the proprietor was selling fuel while the renovations were still taking place. The overall assessment results are clearly shown in Table II.

TABLE II
OVERALL COMPARISON OF PERFORMANCE FOR ALL THE STATION

Name of petrol station	Vehicle service and car wash	Health and safety	House keeping	Work organization and management	Danger from human factor	Chemical safety	Fire safety	Total out of 700	%
Shell	79	72.8	77.6	69.8	92	80	71.6	542.8	77.54
Total Kenya	79	70.8	77.2	69.8	91	80	72.5	540.3	77.20
Maxway	78	64.5	73.2	64	76.8	76.6	58.3	491.4	70.20
Engen	74.8	64.5	74	61.5	75	76.2	57.3	483.3	69.00
Kenol	74.8	64.5	68	60.6	72.6	79.6	58.5	466	66.60
Kobil	73.8	64.5	67	60.6	73.6	79.6	58	477	68.00
Oilcom	73	64.5	71	64	72	76	72	492	70.00
Northgate	74.8	64.5	75.6	64.6	74.8	76.2	58.3	488.8	69.80
Kareme	70	64.5	71.4	61.1	72	72.4	56.6	468	66.85
Crescent	70	64.5	66.6	59.8	73	68.4	55	458.3	66.50
Gulf energy	71	64.5	68	59.8	74	68.6	55	460.9	65.80
Nock	73	77	60	73.1	72	44	35.5	434.6	62.00

J. Comparison of branded and non branded petrol stations

It is clear from the findings that, the multinationals had set precedence in as far as safety in their premises is concerned. They maintained a given level of safety standard which is closely monitored to ensure compliance to the legal framework. In all the stations visited, except in National Oil Corporation of Kenya, the employees had little information

on Directorate of occupational safety and health services and the regulations governing the oil industry. On the other hand, the independent operators were guided well enough by the authority and Energy Regulatory Commission (ERC) government arm.

V. CONCLUSION

From the research findings, the operations at the petrol stations compared fairly for independent and multinationals. How the premise is run depended entirely on the management and their attitude towards safety and health. Public relations also plays a major role in attracting customers and the end effect is that the proprietor makes more profit thereby remunerating the employees well. The equipment and forecourt is always kept clean, employees are always upbeat about their work and follow instruction as required.

VI. RECOMMENDATION

The areas that need to be improved upon include use of PPE, work organization and management and house keeping. Signage is also an issue to be addressed since what appears to be conspicuous are the prices. The legal framework should bridge the gap between the multinationals and the independent operators in as far as the safety of the petrol station attendant worker is concerned to a level where the workers can protect themselves from exposure to conditions which occur later in life due to prolonged interaction with their work environment.

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