International Journal of Educational Studies (INJEDS)
Vol. 1 Iss. 1 (May 2025)
EISSN: 3092-8990 (print)
Website: https://www.injeds.com

Safety Practices Required by the Employees of Motor Vehicle Mechanics in Imo State for Safer Motor Vehicle Industry

Gregory Madu Okparaeke (PhD).
gokparaeke@gmail.com, *gokparaeke@yahoo.com* ;
08063977328

Sylvanus Umunakwe Njoku (PhD).

Department of Industrial Technical Education
College of Education
Michael Okpara University of Agriculture Umudike Abia State

Abstract

The study determined the safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry. This is with a view to preventing accidents among the employees of motor vehicle mechanics and other motor vehicle road users in Imo state for safer motor vehicle industry. The collected data was analyzed with mean and standard deviation. The population of the study comprised of 200 respondents made up of 160 employees of motor vehicle mechanics and 40 supervisory staff of motor vehicle mechanics in Imo state for safer motor vehicle industry. The entire population served as the sample of the study. Structured questionnaire was used as the instrument for the collection of the data of the study. The instrument was face validated by five experts of Anambra Motor Manufacturing Company (ANAMMCO) Emene Enugu State. Their suggestions were used to improve and update the instrument before it was administered to the respondents. The reliability of the instrument was obtained by single administration of the instrument to 30 employees of motor vehicle mechanics and10 supervisory staff of motor vehicle mechanics Nineth mile corner mechanic village in Enugu state. Cronbach Alpha was used to calculate the reliability coefficient of the study. This yielded internal consistency value of .87. The instrument was administered to 200 respondents at the Nekaede and Orji mechanic villages in Owerri with the help of three research assistants. Only one hundred and ninety five questionnaire administered representing 96 % were collected back and used for the study. The result of the study showed that all the safety practices are required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry. The tested hypothesis at $P< 0.05$ level of significance showed that there was no significant difference on the mean rating of the respondents therefore the Ho was up held. Recommendations such as the employees of motor vehicle mechanics should apply safety practices in all their motor vehicle mechanics activities to prevent accidents in the motor vehicle industry among others were made.

Introduction

The rapid innovations and civilization of human race resulted to the unprecedented developments and transformation of the automotive industries. The changes in the automotive industries have been responsible for the discovery, design and production of such automotive crafts or devices like aeroplanes, ships, trains and motor vehicles. The above development indices were not very prominent because in the past, means of transportation had been by trekking, canoe, animals and carts. Making a highlight, Utin, (2007) stressed that the development of automobile over the years has resulted to a continued evolution in design/production to achieve faster, more streamlined, clearer, reliable and safer means of transportation.

Of all the automotive products/devices, motor vehicles are very outstanding in terms of availability, serviceability and utilization. The automobiles, commonly known as motor vehicles, are composite of many complex systems with sophisticated group of technologies assembled together which have become the most important form of transportation across the world. It can be described as a facilitator of the movement of the people and goods which have been contributing to the social and economic development systems of nations (Williams and Anglin 2000; and Schwaller 2012). Mudd (2009) wrote that conventional motor vehicles, are complex assemblies composed of mainly various units and systems such as the chassis or the frame, the body, the suspension system, the power unit, the transmission system, the braking system and the electric system. All of these together make the motor vehicles workable. Ofori in Utin (2007) classified that the engine system is the power plant of the motor vehicle which provide energy to propel (move or drive) the motor vehicle and operates the other systems or units. Ofori added that all vehicle engines work on the basic system of fuel, air and ignition. Ofori finally pointed out that vehicle engines as petroleum (gasoline) engine and diesel engine, with the carburettors and injector systems, prominent to each of the above classes of the engines. Motor vehicles are often identified in classes, such as, bicycles, motor cycles, tricycles, cars, buses, off road vehicles light trucks and regular trucks. These classifications vary according to the legal codes in each country (Wikipedia 2024). On the purposes of motor vehicles, Wikipedia (2024) stated that motor vehicles are self-propelled land vehicle, commonly wheeled which does not operate on rail as trains or tramps used for the purposes of transportations of people and cargos. By the innovations in motor vehicle industry, some motor vehicles operate both on land and water bodies.

The functional or operational efficiencies of motor vehicles are as a result of hard work and technological ingenuity of the employees of motor vehicle mechanics whose services, repair, and maintenances have made motor vehicle operational on regular bases.

Employees of motor vehicle are the trained motor vehicle mechanics equipped with relevant knowledge, technological skills and attitudes for effective maintenance/services of modern automobiles. According to the Schwaller (2012) most important personnel in the automobile industry are those of the motor vehicle mechanics who are involved in diagnoses, services and complete repairs of the problems of motor vehicles. Schwaller, concluded that the increasing sophistication in the automobile industry has led to the development and training of skill employees of motor vehicle mechanics. In further explanations. Utin (2007) explained that employees of motor vehicle mechanics are resource personnel who are responsible for the servicing, repair and maintaining of motor vehicle to its optimal state. Utin added that the service manager is responsible for the service operation of the dealership to ensure proper service to customers, training and coordinating the workers. The manager equally get involved in formulation and implementation of policies. The Forman carry out work that is complex, difficult or sensitive to motor vehicle. Mechanics operatives called service technicians, craftsmen or artisans are responsible for all mechanics, works of diagnoses, services and repairs of motor vehicle.

After effecting repairs, employees run tests on the fixed vehicle. The test conducted by the employees are meant to conform to Ministry of Transport road worthiness standard rules and regulations to ensure that the brakes, steering, tyres and lighten equipment meet minimum requirement with the engine in good working conditions. The employees of motor vehicle mechanics, also, interface with motor spare parts dealers involved with marketing and sales to procure parts for repairs, servicing and maintenance of motor. Operationally, the employees of motor vehicle work extensively on the brake system, carbonators, injection system, oil pumps, oil seals, fuel pumps, fuel filters pistons and rings, radiators, gears, ignition starter system, camshafts, chains, crankshaft, shock absorber, cooling system, clutches, bearing, steering, wheel. This is in addition to tyres, power unit, transmission chassis and suspension system. Employees of motor vehicle mechanics have upgraded their skills and competencies to fix vehicles of emerged technologies such as driverless, amphiboles, flying and electric motor vehicles (Okparaeke, 2017). Todays employees of motor vehicle mechanics are involved with on-board diagnostic technology to avoid potential errors in diagnosing vehicle trouble code and

effect appropriate for repairs. They work with electronics diagnostic equipment, digital manuals and reference materials since modern motor vehicle are highly computerized and equipped with brain box, electronics sensors, actuators circuit and computers.

Schwaller (2012) stated that in the course of the employees of motor vehicle mechanics, carrying out their functions with complex tools and equipment, are often involved in accidents which could be due to ignorance, lack of care, over self-confidence or the taking of unnecessary risks. Other causes of problems are unsafe environment both natural or human, system failures, administrative incompetencies and lack or inadequate supervisions (Okparaeke & Okonkwo,2016).

The common forms of accidents in motor vehicle garages include: fire outbreak from inflammable liquids, harm from rotating machinery-rotating shafts, gears, pulleys and belts with the exposed parts of all powered machines, hit or trap by lifting equipment such as vehicle lifter, screw bottle and trolley jacks, cranes and hoist. Electric shock/electrocutions. Others are axle stands and cradles (Mudd,2009). Other forms of accidents include inhaling of dangerous gases, hit by falling or flying objects, stumbling over objects, jam by moving vehicle, vehicle crashes or collision, injuries from tools and machines (Okparaeke and Okonkwo, 2014; & Mudd 2009).

The effects of the above accidents had negative impacts on the society that can hardly be quantified in monetary values. This is because injuries or death of victims could lead to incapacitation, loss of job or income, abandonment of dependent relative, high medical bills and lost of bread winners. Accident equally leads to damages to tools, equipment, and motor vehicles. It also ends up in the wastages of materials or personnel. Even organizations will lose skilled trained workers to safer occupations (Okparaeke & Okonkwo 2016; and Okparaeke & Njoku, 2022).

Giving the devastating effects of motor vehicle mechanics accidents, safety practices remain preventive measure to save road transportation industry. Safety is preventive measures, actions, precautions and strict adherence to rules and regulations aimed at preventing accident at the work places, workshops or garages to ensure continuity of productivities. (Okparaeke & Okonkwo, 2014 & Okparaeke & Okonkwo, 2016). When safety measures are incorporated in the auto mechanic work processes during maintenances, repairs and services of motor vehicles, safety practices becomes imperative.

However, various measures, such as use of personnel protective devices, traffic signs and symbols have never stopped accidents rather, they have only reduced the rate of regularity and severity. More so, safety practices required by the employees of motor vehicle mechanics should ensure safer road transportation system if well designed, developed and implemented. Therefore, these employees should have enabling work environment and conditions healthier, safer and conducive to enable them to prepare and empower their families, dependent relatives, friends and well-wishers.

Studies by NIOSH CDC (2024) indicated that millions of workers drive or ride in motor vehicle as part of their jobs and motor vehicle crashes are the leading causes of death. Thousands of workers are fatally injured in traffic related motor vehicle crashes with majority of them being motor vehicle mechanics employees.

To ensure the sustainability of automotive industry to meet global development, challenges and to overcome the above high accident rates, the study, Safety Practices Required by the Mechanics in Imo State for Safer Road Transportation Industry becomes necessary.

Statement of the problem

As a result of the critical importance of the motor vehicle industry to the socio-economic development and industrialization of all nations of the world, the employees of motor vehicle mechanics require safer and healthier environment to ply their occupational responsibilities. This will enable them to institutionalize the functionalities of the motor vehicle industry through services, repairs and maintenance operations. Under conducive working environment, these employees are expected to prosper in their occupations to be able to sustain/empower themselves and others. However, Dolan (2009) decried that the employees of motor vehicles in the course of performing their duties are involved in fatal accidents that have resulted to injuries, death, damages to tools and equipment and wastages of materials. This study is therefore is designed to determine the safety practices required by the employees of motor vehicle mechanics in Imo State for accident prevention in the motor vehicle industry.

Purpose of the Study

The purpose of the study is to determine the safety practices required by the employees of motor vehicles mechanics in Owerri capital city of Imo State for safer road transportation industry. Specifically, the study will come up with safety practices that will prevent accidents in motor vehicle mechanic industry.

Research Question

What are the safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry?

Null Hypothesis

The hypothesis was tested at > 0.05 level of significance

H_o: There is no significant difference in the mean rating of motor vehicle mechanics (operatives) and the supervisory staff of motor vehicle mechanics on the safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry.

Methodology

Survey research design was used for this study. The survey design was used because the researcher just collected information from the respondents. According to Okparaeke (2013) a descriptive survey research design was a design used to collection data from a population that is a systematically selected segment of the population for the purpose of determining and identifying the attributes and the characteristics of the population of the study. This design had been assumed very suitable because the study *determined the* safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry. The area of the study is Imo State with concentration on Nekede and Orji mechanic villages in Owerri capital territory Imo state. The population of the study comprised of 200 respondents comprised of 160 employees of motor vehicle mechanics and 40 supervisory staff of motor vehicle mechanic (foremen, supervisors managers and employers or garage owners). Random sampling technique was used to select the 200 respondents that served as the population of the study. The instrument for data collection was a structured questionnaire comprising 27 items with five response options rating scale of: Safety Practices Highly Required (SPHR) =5, Safety Practices

Required (SPR) = 4, Safety Practices Slightly Required (SPSR) = 3, Safety Practices Not Required (SPNR) =2, Safety Practices Highly Not Required (SPHNR) = 1 were used for this study. The instrument was face validated by five experts of Anambra Motor Manufacturing Company (ANAMMCO) Emene Enugu State.

Their suggestions were used to improve and update the instrument before it was administered to the respondents. The reliability of the instrument was obtained by single administration of the instrument to 30 employees of motor vehicle mechanics and10 supervisory staff of motor vehicle mechanics Nineth miles corner mechanic village in Enugu state. Cronbach Alpha was used to calculate the reliability coefficient of the study. This yielded internal consistency value of .87. The instrument was administered to 200 respondents at the Nekaede and Orji mechanic villages in Owerri with the help of three research assistants. Only one hundred and ninety five questionnaire administered representing 96 % were collected back and used for the study.

Data Analysis

The data of the study was analyzed with mean and standard deviation to answer the research question and the hypothesis tested with z-test at 0.05 levels of significance and degree of freedom of 2 and 193. The tested hypothesis with the calculated value less than the table value showed null hypothesis Ho which indicated that there is no significant difference in the mean ratings of the respondents on the safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry

Table

Safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry.

Research Question

What are the safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry?

N 195

S/ No	Safety practices required for accidents prevention	- X	SD	z-cal value	z-tab value	DF	Result
1	Use nose mask to prevent inhaling of poisonous substances	3.7	1.0	1.2	1.86	193	SPR
2	Not allowing open flame or direct heat source into store, workshop or garage	3.6	0.9	1.0	1.86	193	SPR
3	Service fire extinguishers made available to keep them in good working order	4.0	1.1	1.3	1.86	193	SPR
4	Make fire extinguisher available at various positions in the workshop	3.6	1.2	1.5	186	193	SPR
5	Educating workshop users about the position and operation of fire fighting appliances.	3.8	1.3	1.3	1.86	193	SPR
6	Covering rotating shafts, gears, pulleys and belts with the appropriate guards to avoid hazard	3.5	1.0	1.4	1.86	193	SPR
7	Disconnecting all machines from electricity sources and demobilize them before working on any of them.	3.9	1.2	0.9	1.86	193	SPR
8	Using the correct dressing code; such as, overall no flowing gown or shirt, necklace or long hairs, near the equipment.	3.7	0.8	1.2	1.86	193	SPR
9	Insulating and careful handling of electrical cables or installations to prevent electrocution or electric shock	3.8	1.1	1.1	1.866	193	SPR
10	Covering garage pits with guards to avoid falling in of person or objects	4.0	1.3	1.5	1.86	193	SPR
11	Ensuring that vehicles are on hand break, centralized, with closed doors, chocked wheels to avoid fouling other vehicles or building when raising them with vehicle lifts.	3.6	1.3	1.3	1.86	193	SPR
12	Engaging the automatic locks of vehicle lifts to prevent accidental dropping of lifted vehicles.	3.7	1.1	1.2	1.86	193	SPR
13	Lowering lifted vehicles only after checks that mechanics, tools or equipment are cleared from the ramp or pit.	3.5	1.2	0.9	1.86	193	SPR
14	Supporting jacked or lifted vehicles with logs concrete blocks or engine block before working under the vehicles	3.8	1.1	1.0	1.86	193	SPR
15	Placing jacks, screws or **bo**ttles on firm ground before vehicle lifting to prevent accident or vehicle damage	3.7	1.0	1.2	1.86	193	SPR
16	Never subjecting lifting equipment to loads above the designed capacity	3.6	1.2	1.3	1.86	193	SPR

17	Checking the brake system before test driving and handing over of the repaired vehicle to the owners.	3.8	1.2	1.0	1.86	193	SPR
18	Cleaning oil, gas or paints spillage on the workshop floors to prevent falls from slippery environment	3.5	1.2	1.1	1.86	193	SPR
19	Cleaning all traces of fuel or petrol from tanks before subjection to heat or welding operations to avoid fire out break or explosion	3.8	1.2	1.0	1.86	193	SPR
20	Keeping gang ways free of obstacles to avoid stumbling and falls from objects/obstacles	4.0	1.3	1.2	1.86	193	SPR
21	Garages and pits should be well ventilated and if possible extraction fans installed for protection from foams and gases	3.6	1.1	1.4	1.86	193	SPR
22	Storing oily rags inside sealed bins to prevent fire out break from sparks or heats	3.5	1.0	1.0	1.86	193	SPR
23	Experts performing hazardous and sensitive jobs under strict supervisions for accidents preventions,	3.9	0.8	1.3	1.86	193	SPR
24	Using the correct tools/ equipment for the right job to avoid facility abuse, damages or injury to persons.	4.1	0.9	1.2	1.86	193	SPR
25	Considering the load carried by a commercial vehicle when lifting the vehicle for repair work.	3.8	1.2	1.0	1.86	193	SPR
26	Not directing grease nozzle to any person or persons during lubrication operations to avoid serious accidents	3.5	1.1	1.4	1.86	193	SPR
27	Avoiding high pressured air from compressor entering human body as air pressure beyond that of the atmosphere could result to injury or death	4.2	1.2	1.4	1.86	193	SPR

Key – **X – mean, SD – Standard Deviation, z –cal value – z- calculated value, z – tab value – z – table value, SPR – Safety Practices Required and SPNR – Safety Practices Not Required**

The result of the table showed mean range of 3.5 to 4.2 this mean range is above the minimum 3.50 agreed that all items will serve as Safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry

The table equally indicated the standard deviation range of 0.8 -1.3. This range showed uniformity in the responses of the respondents and that the mean is not far from each other. The outcome of the hypothesis tested at <0.05 level of significance at the degree of freedom of 58 indicated that all the calculated z -value is lower than the z-table value. This showed that there

was no significant difference in the mean ratings of the respondents on Safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry

Discussion of the findings

The findings of the study indicated that all the safety practices are required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry. This result corroborated with recommendations of experts. Mudd (2009) directed that the employees of motor vehicle mechanics should apply skills in the use of lifting or hoisting and supporting equipment. Dolan (1999) stated that naked light, smoking and all heat sources should be prohibited to avoid fire out breaks. Okparaeke and Okonkwo (2014) instructed that Personnel Protective Equipment should be provided by the employers and should be used by employee of motor vehicle mechanics of motor vehicle industry. Finally, Okparaeke (2020) stated that all engineering or technology works in the motor vehicle industry should be done under supervisions to prevent accidents.

The result of the hypotheses equally indicated that there was no significant difference in the mean ratings of the respondents on the safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry.

Conclusion

Accidents in the industrial and technological systems have always hindered productivities and affected output of goods and services. The motor vehicle industry has records of been heavily involved in industrial accidents occurrences. The employees of the motor vehicle industry have always recorded high levels of fatalities and mortalities or morbidities from accidents in the motor vehicle mechanics occupation. Losses in the area tools, equipment and motor vehicles had remained unprecedented. While wastages of time, human and material resources have alarmingly remained uncontrollable. To save the motor vehicle industry from total extinction, accidents preventive measures become imperative. This therefore necessitate Safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry. If the high accident rate in the motor vehicle industry can be prevented or be reduced to barest minimum then studying Safety practices required by the employees of motor vehicle mechanics in Imo state for safer motor vehicle industry is worthwhile venture.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. The employees of motor vehicle mechanics should apply skills in the use of lifting or hoisting and supporting equipment to prevent accidents
2. Naked light, smoking and all heat sources should be prohibited from the garages to avoid fire out breaks.
3. Personnel Protective Equipment should be provided by the employers and should be used by employees of motor vehicle mechanics for safer motor vehicle industry.
4. All engineering or technology works in the motor vehicle industry should be done under supervisions to prevent accidents

References

NIOSH CDC (2024) national institute of occupational safety and health cdc. *www.usa.gov.agencies*. National Safety and Health. Retrived 17/6/2024.

Okparaeke, G. M. (2006). Safety practice skills required of employees in the block laying industry. *Review of Education; Institute of Education Journal, University of Nigeria, Nsukka. 17* (1) 131- 137.

Okparaeke, G. M., & Okonkwo, M. O. (2016). Safety practice skills required by building construction employees in the use of metals in building. *Journal of Education Foundation,*

University of Nigeria, Nsukka, 6(7), 25-35.

Okparaeke, G. M. (2020). Psychological factors responsible for accidents in the building industry in Imo State for a healthier and safer built environment. *Journal of the Society for Psychosocial Research of Nigeria, 10*(2), 117-126.

Schwaller, A. E. (2012). *Motor automotive technology*. Delmar Publisher.