

Enhancing Safety Management Practices in Mechanical Workshops in Kumasi Suame Magazine Industrial Sector

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Abstract – The study examined how artisans in the Suame Magazine Industrial Sector managed safety in mechanical shops. It also assessed the educational levels of the artisans, the causes and effects of accidents in the Suame Magazine Industrial Sector. The study would be used as a model for instructing the artisans about proper safety practices. The type of design employed was a descriptive survey. The population was made up of welders, machinists, shop owners, and industrial inspectors. A sample of 49, comprised of 12 machine shop owners, 37 artisans, and 1 factory inspector, were randomly selected from the Suame Magazine Industrial Sector. We prepared four sets of questionnaires to collect data for the study. Version 21 of the Statistical Package for Social Sciences (SPSS) was utilised for data analysis. The educational levels of most of the shop owners and artisans in this sector were vocational, technical, and junior high school levels, constituting 26.5%, 14.3%, and 24.5%, respectively. Apart from formal education, the majority (54%) of the shop owners and artisans had no privilege to do any training on workshop safety. Additionally, the study uncovered that a greater number of shop owners and artisans (62.2%) do not have maintenance schedules but undertake maintenance when their machines develop faults or break down. The findings reveal that a significant number of shop owners and artisans don't read instructions on machines before working on them or using them. Furthermore, a significant number of the shop owners and the artisans (65.3% and 65%), respectively, neither notify the factory inspectorate of their existence nor report accidents. It is suggested that the Factories Inspectorate Department (FID) work with technical universities to develop in-depth training programmes for industrial shop owners and artisans. The FID should zero in on the industrial area as part of their operational areas and strengthen safety activities there. More factory inspectors need to be employed to work effectively to cover all the big and small-scale industries within their jurisdiction.

Keywords – Machinists, Safety Practices, Safety Management, Welders, Mechanical Craft and Workshops.

I. INTRODUCTION

The complexity of procedures in numerous sectors has risen due to the rapid development of technology, changing work circumstances, and new organisational structures. This has made a close-fitting integration of technological and human subsystems necessary (Maryam, 2009).

Concurrently, workshop tragedies have also risen in sophistication and prevalence. This is a result of more reliance on technology has resulted in more problems affecting numerous individuals, as well as more harm to properties and the natural world (Zimolong & Elke, 2006). It is now clear that environmental conditions, technology malfunctions, or human mistake are not the only causes of this kind of exposure. Instead, from set organisational norms and practices, which have been consistently demonstrated to precede the unfortunate

events. Safety professionals have been concentrating on corporate principles that could contribute to safe performance in industries and the management of hazards and emergency situations in the last few years. According to International Labour Organisation (ILO), and cited by Bambang (2010) that every year, about 2,000,000 people worldwide pass away as a result of their jobs. The fatalities at work account for a minor portion of the misery. Over one hundred and sixty million people have work-related illnesses. Some three hundred and fifty-five thousand fatal accidents take place annually.

For every fatal accident at work, some five hundred to two hundred non-life-threatening injuries occur, based on the nature of work. However, these catastrophes at work seldom ever reach the news. Accidents and fatalities at workplace happen, not inevitable. The leading cause of occupational deaths (an estimated 32% of work-related deaths) is ionising radiation, asbestos, and other carcinogenic dusts and chemicals. Other leading causes of death include circulatory diseases, accidents (19%), communicable diseases (17%), stress, shift and nocturnal work, certain substances, and pervasive smokers at workspaces are among the other major causes of mortality at factories. The numbers in different places of the world vary significantly.

When using machinery and equipment, there are risks associated with it. This is due to defective machinery and inadequate safety procedures. The risk could harm the machine and equipment, as well as the operator and anyone nearby (Anaele et al., 2014; Giraud, 2009; Cheng & Li, 2021). These risks include trapping within the carriage drive, being drawn into and crushed at the feed roller. According to the UK Health and Safety Executive [HSE], 2012, the range of injuries includes limb or finger bruising, amputation, and in certain situations, unexpected death.

In Ghana, the majority of industries and craftspeople generally disregard established occupational safety rules and regulations. For instance, the events of April 21st, 22nd and 30th, 2011, at Western Steel and Forgings Limited in Tema, and the Juabeng oil mills on the October 5th, 2021, which resulted in the deaths of three and injuries of three workers and university students participating in an industrial attachment. Nonetheless, absence of prevention, a solid safety philosophy and values, secure working surroundings, and inadequate safety information are the main causes of the majority of industry accidents and events at Kumasi Suame Magazine workshops.

Currently, ILO is preaching for the provision of decent work worldwide. The ILO (2021) defined decent work as “productive work for women and men in conditions of freedom, equity, security and human dignity”. Quality employment and decent work conditions help reduce inequalities and poverty, creating and promoting jobs that provide decent earnings, ensuring safe working conditions, providing social protection, safeguarding workers’ rights, improving living standards, raising productivity and fostering social cohesion. According to the ILO, the agenda on employment and decent work focuses on some of these priority areas:

- Maximize decent job creation, assisting job advancement.
- Improve the quality of jobs in both the formal and informal economies in terms of earnings and working conditions.
- Risk control is essential to reducing occupational injuries at work in engineers and factories. Research indicates that there is potential for enhanced safety through management's application of safety protocols. Workplace safety and hazard prevention are not exclusively the duty of the employer. Employees are on the

front lines of workplace safety and are in the best position to identify potential hazards. By doing this, they keep themselves and others working around them safe.

According to Ezeji and Onoh (2008) and Anaele et al. (2014), safety is the purposeful regulation of activities and events with the goal of preventing harm to participants, bystanders, and workshop equipment and supplies. Governments, businesses, employees, and their families are concerned about occupational safety and health on a global scale (ILO, 2008). While certain occupations are by nature riskier than others, workers from marginalised groups, such as migrants, are frequently more vulnerable to work-related accidents (Makela, 2008; Manuele, 2019). According to Muiruri and Mulinge (2014), safety management is crucial for determining appropriate safety measures and approaches to address significant health and safety issues. Safety management is a shared responsibility between employers and employees.

Machine shops are frequently the scene of industrial accidents and health risks, and Suame Magazine Industrial Sector is not an exception. This is because some of them do not have adequate information in factory safety acts, advanced machinery, which is affecting their mode of operations significantly. When accidents happen, it may result in fatalities or serious injuries, which has a negative impact on the country overall and on the manufacturing sector specifically. This study examined how safety is handling in workshops at Suame Magazine to reduce industrial accidents and hazards among the workers and the artisans in the area, regardless of the magnitude of the shops (Nguyen, 2021; Adu-Gyamfi, 2021).

II. RESEARCH METHODOLOGY

The following areas were looked at: Research design, population and sample, instrumentation, data collection procedures and data analysis.

2.1. *Research Design*

This study employed qualitative and descriptive design to collect and statistically analyse the data. Descriptive design deals with inferring relationships among variables and describing their relationship.

2.2. *The Study Area*

The study was carried out in the Suame magazine industrial area in Ashanti, Ghana. The industrial area has many workshops for metal engineering and vehicle repairs in Ghana, employing an estimated 200,000 workers. The population is the most industrialised zone in Ghana and one of the largest industrialised zones in Africa. It is 10 kilometres from Kumasi, the capital of the Ashanti Region. Situated in the Suame constituency, it is a part of the administrative district of the Kumasi Metropolitan Assembly (KMA).

2.3. *Population and Sample*

The study population included shop owners, artisans (machinists and welders) and a factory inspector. The data was gathered using the random sample method. A total of 12 shops were visited. A sample of 12 shop owners, 1 factory inspector and 37 apprentices from the various workshops were used.

2.4. *Instrumentation*

There are a number of data collection instruments to be used, but the self-completion questionnaire was cons-

considered most suitable for the study. The questionnaires were in line with the purpose of the research, the objectives, and the literature review. Close- and open-ended questions were used. The survey instrument was pre-tested on a small sample of workers to verify its appropriateness and clarity.

2.4. Data Collection Procedures

Observation and questionnaires were the main data collection instrument used. The survey forms were handed out to the owners of shops and skilled workers of the designated sites after pre-testing. A one-week duration was given to the respondents to complete and return them. A group of helpers and the researcher assisted those who were illiterate, gathering the questionnaires for analysis afterwards.

2.5. Data Analysis

The responses obtained from the questionnaires in terms of the shop owners' viewpoints and the artisans' viewpoints were used to analyse the study. The analysis of the data was done with SPSS version 21.

III. ANALYSIS OF RESULTS

SPSS v. 21 was used to analyse the data in accordance with the research questions based on the answers to the questionnaires.

Three sets of questionnaires were distributed to the participants, which included shop owners, artisans (such as welders and machinists), vehicle body builders (VBB), and the FID official. Thirty-five (35) questionnaires were handed out to the owners of shops, 14 to the machinist and the welders, and the corresponding response rates sum up to 49. The purpose of the FID was to evaluate respondents' involvement with regard to industry safety. The sample size used was considered using Nwaba (1992) principle.

IV. RESULTS AND DISCUSSION

4.1. Gender and Age Distribution

The percentages of men and women were, respectively, 89.8% and 10.2%. The age range of the respondents was 16 to 54 years old, with a standard deviation of (SD+1.848) for each age group. The majority of respondents (20%) were in the 25–29 and 35–39 age ranges, as indicated in Figure 1a, Table 1.

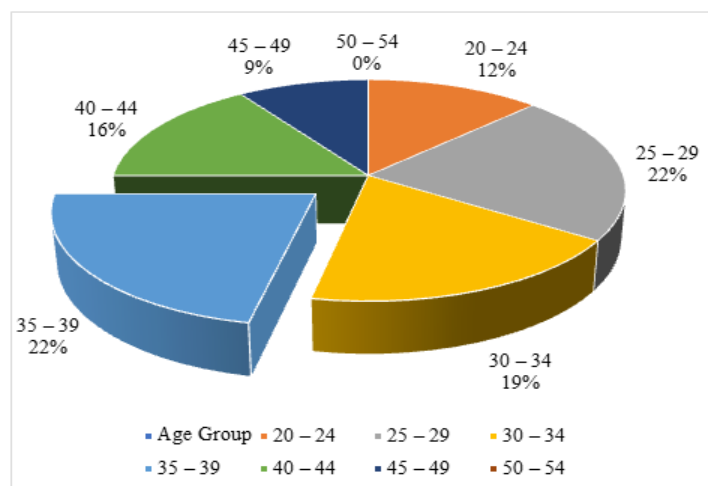


Fig. 1a. Age Distribution of Shop Owners and Artisans (Welders and Machinists).

Table 1. Age Distribution of Shop Owners and Artisans (Welders and Machinists).

Age Group	Welders (N = 35)		Machinists (N = 14)	
	Freq.	%	Freq.	%
16 – 19	1	2.85	-	
20 – 24	4	11.42	1	7.1
25 – 29	7	20.00	2	14.2
30 – 34	6	17.14	2	14.2
35 – 39	7	20.00	2	14.2
40 – 44	5	14.20	3	21.4
45 – 49	3	8.57	2	14.2
50 – 54	2	5.70	2	14.2
Total	35	100.0	14	100.0
Total	35	100.0	14	100.0

Source: Survey, 2024.

Level of Education and Skill Training of Shop Owners and the Artisans

Figure 1, presents each participant's educational attainment. According to the data, among the participants, 14.3% and 26.5% had completed technical and vocational education, 24.5% had completed junior secondary school, 12.2% and 10.2% had completed middle and primary school, and 2.0% had no formal education.

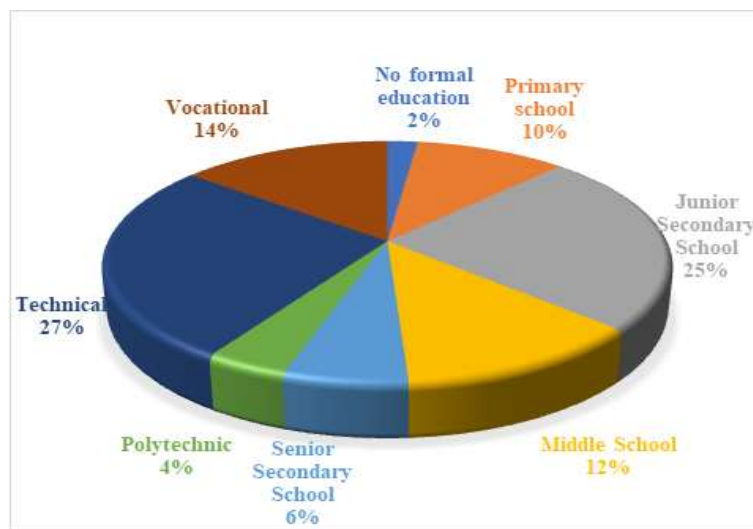


Fig. 2. Level of Education of Shop Owners and Artisans (Welders and Machinists).

Source: Survey, 2024.

Table 3. Work Experience of Shop Owners and Artisans (Welders and Machinists).

Year – Range	Welders and Machinists	
	Frequency (n)	Percentage (%)
1 – 5	3	6.1

Year – Range	Welders and Machinists	
	Frequency (n)	Percentage (%)
6 –10	11	22.4
11 –15	9	12.2
16 –20	6	18.4
21 –25	10	12.2
26 –30	6	20.4
31-above	4	8.2
Total	49	100.0

Source: Survey, 2024.

Training

Questions in this section looked at the artisans and the shop owners who had privilege of attending training on safety at work and the advantages that they gained.

Opportunities to Attend Courses

The shop owners and the artisans (54%) had never attended any course or workshop on industrial safety, while 46% had the privilege to join courses on industrial safety.

Twenty-two (22) vehicle body builders (welders) who responded in the affirmative Yes had the chance to learn about industrial safety as a subject in their technical college courses, and six (6) had the chance to participate in a workshop run by the Factories Inspectorate Division at the Kumasi Technical Institute and the Ghana National Association of Garages (GNAG).

Usefulness and Benefits

Almost all the welders and Machinists respondents (95.7% and 79.2 %) acknowledged the usefulness of such courses. They indicated that the course did upgrade their knowledge in safety procedures or safety precautions, materials handling and management skills and practices. Among the remarks made by participants regarding the usefulness were:

“I had the opportunity to learn a bit of safety management during the course”.

“The course enhanced my skills and knowledge”.

Enforcement of Safety Laws

The following are the subheadings to be discussed: Visits and Inspections, Accident Reporting and Investigation and Notification of Business.

Visits and Inspections

When asked if personnel from the Factories Inspectorate Department ever visited their establishment, 41.8% of the respondents replied ‘yes’ and 59.2% had no visit. Table 4 indicates that, with regard to supervisory visits

by representatives of the Ghana National Association of Garages, 24.5% had supervisory visits, 34.7% had visits occasionally, and 40.8% had no visits at all.

Accident Reporting and Investigation

In terms of accident reporting and investigation, about 25% of shops report on a regular basis, 10% report on occasion (sometimes), and 65% report no accidents at all.

Regarding who was notified of these incidents, 37.5% said they notified the Ghana National Association of Garages' zonal executives, and 62.5% said they notified the Factories Inspectorate Department (FID).

Notification of Business

Few respondents (34.7%) report to the FID about the launch of their businesses, compared to the majority (65.3%) who do not.

Table 4. Enforcement of Safety Laws.

Questions/ Variables	Responses		
	Welders (Vehicle Body Builder) and Machinists		
	Yes	Sometimes %	No %
	(n = 49)	(n = 49)	(n = 49)
Visits and Inspection Do factories inspectorate personnel visit your shop?	20 (40.8)	-	29 (59.2)
Do officials from Ghana Association of Garages visit and inspect your work?	12 (24.5)	17 (34.7)	20 (40.8)
Accidents Investigation Do personnel from the Ghana Association of Garages investigate accidents to identify their causes when they occur?	6 (13.0)	-	40 (87.0)
Notification of Business Have you notified the chief factories inspector?	17 (34.7)	-	32 (65.3)
Report of Accidents Do you report all health hazards and accident cases, which occur in your shop?	10 (20.4)	7 (14.3)	32 (65.3)

Source: Survey, 2024.

Attitudes of Shop Owners and Artisans towards safety Management in Machine Shops

This section of the study discusses the work conditions: warning notice/sign, illumination, ventilation, maintenance, housekeeping and first aid at the machine shops at the Suame Magazine Industrial Area.

Work Conditions

The work conditions under which the shop owners and the artisans operated in various workshops are detailed in Table 5. They are as follows:

Warning Notices (Sign)

Thirty-two-point seven percent (32.7%) of the respondents display warning notices at places of potential danger in their workshops, 16.3% sometimes display them, whereas 51% do not. As to the display of warning notices on faulty machines, 26.5% do display warning notices, 12.2% sometimes place warning notices, and the majority (61.2%) responded they do not place warning notices (sign) on their machines when they become faulty, as they quickly repaired them for use.

Illumination

On illumination of workshop, 46.9% responded that they had well-illuminated workshop as they do almost all their work in the open, whilst 44.9% do not have well-illuminated workshop.

Ventilation

When asked about their workshops, the majority of shop owners and artisans who responded to the questionnaires said that they had well-ventilated spaces because welding is done outside. However, 16.3% said that they occasionally had poorly-ventilated spaces, and 22.4% said that their shops lacked adequate ventilation.

Maintenance

Among all the respondents, 34.7% had maintenance schedule for their plants and 65.3% had no maintenance schedule. Nine respondents representing 18.4% maintain/overhaul and undertake preventive maintenance, when their machines broke down, the majority (62.2%) would simply do upkeep and fixes without a schedule in mind.

Housekeeping and First Aid Box

As regards their housekeeping, 59% of the shop owners and the artisans cleaned their shops after each day’s work, 14% sometimes cleaned their shops after work, and 27% never cleaned their shops every day or after the day’s work. Only 16.3% of the forty-nine (49) participants reported having an emergency kit in their stores; the rest (83.7%) do not.

Minor Cuts

When it comes to minor cut treatment, 55% of patients get their cuts properly dressed and treated right away at the clinic, 16% occasionally do so, and 29% do not.

Table 5. Work Conditions of Workshops.

Questions/ Variables	Responses		
	Welders and Machinists		
	Yes %	Sometimes %	No %
Display of Warning Notices (Sign) Do you put up warning signs in areas where there can be threats?	16 (32.7)	8 (16.3)	2 (51.0)
Display of Notices on Faulty Machines / equipment Do you make sure that any malfunctioning equipment have warning signs visible so that users can ignore them?	13 (26.5)	6(12.2)	30 (61.2)
Illumination	23 (46.9)	4 (8.2)	22 (44.9)

Questions/ Variables	Responses		
	Welders and Machinists		
	Yes %	Sometimes %	No %
Is your shop well-illuminated with natural and artificial light?			
Ventilation Is your shop well-ventilated?	30 (61.2)	8 (16.3)	11 (22.4)
Maintenance Does your machine and equipment have a service timetable?	14 (29.2)	12 (25.0)	22 (45.8)
Housekeeping Do you have your thoroughly cleaned your shop after the day's work?	17 (35.4)	18 (37.5)	13 (27.1)
First Aid Box Does your workshop have emergency kit?	8 (16.3)	-	41 (83.7)
Minor Cuts Do you treat minor cuts properly?	27 (55.1)	8 (16.3)	14 (28.6)

Source: Survey, 2024.

Causes of Accidents and their Effects

The perception of accident causes and their consequences in the machine shop is covered in this section.

Perspectives on Accident Causes

Based on information gathered to evaluate the causes of accidents perceived by the machine shop owners at Suame magazine, the majority of artisans and shop owners (20.4%) responded that accidents occurred frequently in their shops, 22.4% occasionally experienced accidents, and the majority (57.1%) did not experience accidents. According to Table 6, 22.4% of respondents believe that unsafe acts, such as exposing electric wires and parts, using defective tools, using tools or equipment incorrectly, and being inattentive, are causes of accidents.

Table 6. Occurrences of Accidents and Causative Factors.

Questions /Variables	Responses	
	Welders and Machinists (N = 49)	
Occurrence of Accidents	Freq.	%
Yes	10	20.4
Sometimes	11	22.4
No	28	57.1
Total	49	100.0
Accident Causative Factors		
Tiredness/ Overtime	5	14.3

Questions /Variables	Responses	
	Welders and Machinists (N = 49)	
Inexperience	7	10.2
Poor housekeeping	4	8.2
Overconfidence	5	10.2
Inattentiveness / Carelessness	12	24.5
Attitude	4	8.2
Unsafe acts and unsafe conditions	12	24.5
Total	49	100.0

Source: Survey, 2024.

Table 7. Perspectives on Accidental Effects.

Questions/ Variables	Responses	
	Welders and Machinists (N = 49)	
Effects of accidents/injuries at work shop on artisans and machines	Freq. (n)	Percentage (%)
Loss of man hours, absenteeism, deformities, bodily pains, use of faulty tools, cost of treatment	9	18
Damages to machine tools/equipment		
Cost of repairs, reduced productivity	12	25
All the above	28	57
Total	49	100

Source: Survey, 2024.

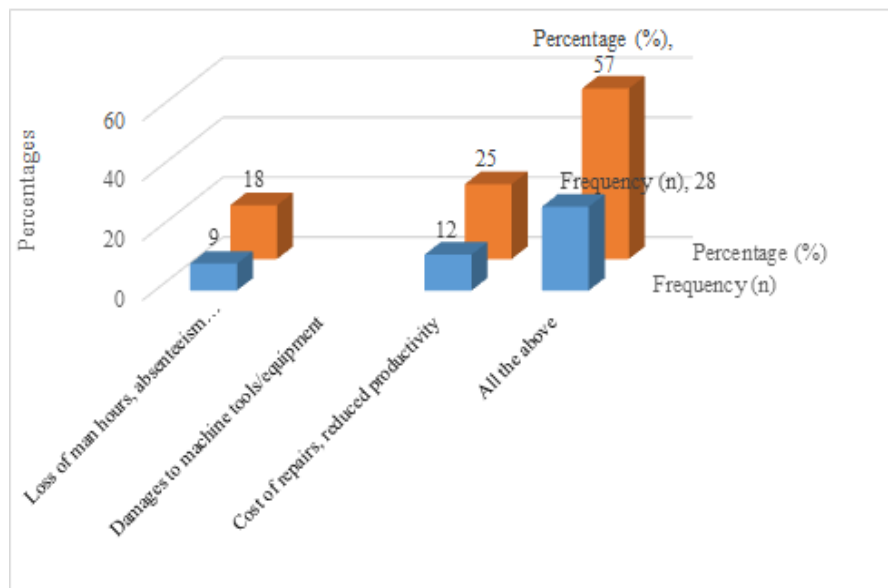


Fig. 3. Insights into the Effects of Accidents.

Source: Survey, 2024.

Insights and Effects of Accidents

An effect profile is set out in Table 7. It shows the effects of a particular situation, either on the shop, machinery or individual artisans. More than half of the respondents, i.e., 57%, said that accidents and injuries have negative effects on shops by dropping output, while 18% stated it drained the shop financially due to loss of working hours, absenteeism, deformities, bodily pains and a higher cost of treatment for the incapacitated artisans. This corroborates Anaele et al. (2014). In respect of effects on the machinery, 25% mentioned that the cost of repairs or replacement of the entire machine reduced production.

Shop Owners and the Artisans Attitudes towards Observing Industrial Safety Rules and Regulations

The attitude of shop owners and artisans towards observance of industrial safety rules and regulations is looked at in this section. They are use of protective gadgets, observance of safety precautions, working practices and insight of health hazards. According to Rongo (2004), a study shows that auto body workers’ are exposed to hazardous substances from processes such as; cutting, welding, grinding, and spray painting in well-established shops. Taha (2000) opined that those workers in auto-bobby and Auto-mechanics, are exposed to asbestos, metal dust, organic solvents, paint pigments and exhaust smokes, which pose serious risks to the workers health. Therefore, adherence to safety rules and regulations to reduce occupational risks and hazards within the automobile repair workshops is very important.

Table 8. Use of appropriate safety Protective gadgets.

Questions/ Variables	Responses		
	Welder (n = 35) and Machinists (n = 14)		
	Yes %	Sometimes %	No %
Use of protective gadgets			
Do you put on goggles when chipping or grinding?	22 (44.8)	9 (18.3)	18 (36.7)
Use of appropriate shield when arc welding	18 (51.4)	7 (20.0)	10 (28.6)
Do you use masks when welding objects that emit fumes and gases?	8 (22.9)	10 (28.6)	17 (48.6)
Do you handle sharp components with gloves?	10 (29.4)	10 (29.4)	14 (41.2)
Do you put on protective clothing such as overall, leather apron when working?	11 (22.4)	16 (32.6)	22 (44.8)
Do you wear prescribed safety boots in the shop?	18 (36.7)	17 (34.6)	14(28.3)
Do you wear canvas boots in the shop?	12 (24.4)	21 (42.8)	16 (32.2)
Total	99 (33.0)	90 (30.0)	111 (37.0)

Source: Survey, 2024.

Table 9. Observance of Safety Precautions.

Questions / Variables	Responses					
	Welder (n = 35)			Machinists (n = 14)		
	Yes %	Sometime %	No %	Yes%	Sometimes%	No%
Use of protective gadgets: Do you;						

Questions / Variables	Responses					
	Welder (n = 35)		Machinists (n = 14)			
	Yes %	Sometime %	No %	Yes%	Sometimes%	No%
Wear goggles when chipping or grinding.	17 (48.6)	6 (17.1)	12 (34.3)	5 (35.7)	3 (21.4)	6 (42.9)
Use the appropriate shield when arc welding.	18 (51.4)	7 (20.0)	10 (28.6)	-	-	-
Wear masks when welding objects that emit high harmful smokes and gases.	8 (22.9)	10 (28.6)	17 (48.6)	-	-	-
Put on gloves when handling sharp components.	10 (29.4)	10 (29.4)	14 (41.2)	-	-	-
Wear personal protective equipment such as overall, leather apron when at work?	8 (22.9)	8 (22.9)	19 (53.3)	3 (21.4)	8 (57.1)	3 (21.4)
Wear prescribed safety boots in the shop.	14 (40.0)	12 (34.3)	9 (25.7)	4 (28.6)	5 (35.7)	5 (35.7)
Wear slippers or canvas boots in the shop	12 (34.3)	13 (37.1)	10 (28.6)		8 (57.1)	6 (42.9)
Use of Appropriate Equipment						
Do you use of proper lead cables when arc welding.	16 (45.7)	12(34.2)	7 (20.0)	-	-	-
Do you join metal scraps together to form return lead in arc welding.	18 (51.4)	4(11.4)	13 (37.1)			
Are all revolving parts of machines always well-guarded?	-	-	-	4 (28.6)	4 (28.6)	6 (42.9)
Is soluble oil or coolant used in the machine frequently changed?	-	-	-	3 (21.4)	9 (64.3)	2 (14.3)
Do you regularly check electrical fittings and connections?	20(57.1)	6(17.1)	9 (25.7)	2 (14.3)	2 (14.3)	10 (71.4)
Working Practice						
Do you do overtime in as much as you have many jobs?	8 (22.9)	15(42.9)	12 (34.3)	9 (64.3)	4 (28.6)	1 (7.1)
Do you try to lift very heavy objects that can cause strain alone?	8 (22.9)	6(17.1)	21 (60.0)	3 (21.4)	-	11 (78.6)
Do you have you used files without handle due to experience?	-	-	-	2 (14.3)	3 (21.4)	9 (64.3)
Do you handle light and handy work pieces with bare hands when drilling?	-	-	-	8 (57.1)	3 (21.4)	3 (21.4)
Do you read instruction on machine before working on or use?	9(25.7)	7(20.5)	19 (54.3)	2 (14.3)	4 (28.6)	8 (57.1)
If yes, do you do exactly as you are instructed?	5(35.7)	2(14.2)	7 (50.0)	2 (33.3)	1 (16.6)	3 (50.0)
Do you speed up production beyond economic rate to produce more?	8 (22.9)	6 (17.1)	21 (60.0)	9 (64.3)	4 (28.6)	1 (7.1)
Do you always extract smoke materials out of reach of sparks?	6 (17.1)	5(14.3)	24 (68.6)	-	-	-
Do you remove all combustible materials out of reach of sparks?	30 (85.7)	1(2.9)	4 (11.4)	-	-	-
Source; Survey, 2024						

Use of Appropriate Equipment

The majority of machinists, i.e. 42.9%, claimed they do not cover all rotating parts of their machines with appropriate guards, while ‘sometimes’ and ‘yes’ recorded 28.6%. As presented in Table 9.

Working Practice

Results in Table 9, showed that 54.3% and 57.1% (55.1%) of both welders and machinists do not read instructions on new machines before use, while 25.7% and 14.3% total (22.4%) read. Out of the 45% who read or sometimes read, only 35% (35.7% and 33.3%) do exactly as instructed and 50% do not. Some respondents said most are: lazy, assume they can use common sense, Instructions the manual are sometimes difficult to read, poorly written and written in another language. This reflects the views of Massimo (2018).

Assessing the rate at which the artisans work, 35% (22.9% and 64.3%) of the artisans affirmed they always work faster than the normal working pace whenever there is a great demand for their products. 45% (60.0% and 7.1%) of the respondents said, irrespective of the demand for their products, they do not exceed their normal, economic rate of production. Some of the artisans, 35% (22.9% and 64.3%), agreed that they overwork themselves whenever there is a lot of work to do. On the contrary, 26% (34.3%) shop owners and 7.1% of the artisans said they always close from work on schedule even if they have a lot of work to do, whilst 33% admitted that they sometimes involve themselves in overtime jobs. This is in line with Dembe et al. (2005), who found that overtime jobs schedules are related to 61% higher injury rate as compared to non-overtime jobs.

Concerning the lifting of heavy objects, 60% of welders and 78.1% of machinists answered that they have never lifted heavy objects that could cause strain to the body, 17.1% sometimes lift heavy objects alone, and 22.9% and 78.6% said ‘yes’.

Most machinists, i.e. 57%, accepted that they handle small and handy work pieces to drill on a drilling machine without using a hand vice or clamp, while ‘sometimes’ and ‘no’ recorded 21%, respectively.

Insight of Health Hazards

As regards health hazards in Table 8, 44.8%, 18% and 36.7% are the percentages of respondents who use, sometimes use and do not use goggles as protective gadgets, respectively. With the use of shield, 51.4% of welders use appropriate welding shields when arc welding, while 28.6% do not.

Table 8 further revealed that 48.6% of the welders do not wear masks when welding objects such as galvanised components, which emit highly noxious fumes and smoke, but 28.6% sometimes do not.

When handling components with sharp edges, about 29.4% put on gloves, while 41.2% do not. Which means that safety is not paramount to them.

With regards to the wearing of safety boots, 28.3% do not wear them, 34.7% sometimes do, and 36.7% do so regularly. Forty-four-point eight percent (44.8%) of the artisans’ work without well-fitting overalls and leather aprons (Table 8).

V. CONCLUSIONS

- Educational levels of most of the shop owners and the artisans (skills workers) in this area was very low.

Due to this, a greater number of the workers do not see the need to read instructions on new machines and adhere to, that could result in accidents.

- Both skilled and unskilled workers do not have the chance to attend any additional training on work place safety.
- The owners of the shops and the artisans in Suame Magazine Industrial Zone lack basic safety management skills in their shops.
- Shop owners and artisans do not report their establishment and accident cases to the appropriate officers, such as the FID. Accidents have effect on productivity because of the shop owners, and artisans of absenteeism and cost of replacing the machine parts.
- Industrial Safety Management Culture and regulations are not significant to shop owners and the artisans in their machine shops.
- Recommendations
- Successful implementation of the following recommendations would help improve safety supervision of machine shops at Suame Magazine Industrial Area.
- The FID and Ghana National Association of Garages (GNAG) should organise detailed and operative instruction and drill programmes for officials, shop owners and artisans) on workshop safety administration.
- The FID and GNAG could arrange with the Technical Universities to plan an effective training conference for members in the Industrial Zone.
- The GNAG could install bulletin boards at vantage points in the industrial area to display pictures, sketches and cartoons about safety so that members, especially the illiterate, could see them and be reminded of industrial safety practices. Audio visuals (radios, films) on industrial safety could be obtained from the FID and shown to members periodically by the GNAG:
- FID should zero in on the industrial area as part of their operational areas and strengthen safety activities there. Again, they should employ more workers to work effectively to cover all the big and small-scale industries within their jurisdiction.

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