



## **Occupational Health and Safety Practices Assessment in Damietta Port, North Egypt**

**Mokhtar S. Beheary<sup>1</sup>, Ahmed Abdelaal<sup>1</sup> and Samira M. Matar<sup>2\*</sup>**

<sup>1</sup>Department of Environmental Science, Faculty of Science, Port Said University, Egypt.

<sup>2</sup>Department of Occupational Health and Safety, Damietta Port Authority, Egypt.

### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author SMM designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors MSB and AA managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Occupational, health and safety system (OHS) is a sensitive item for each organization. Health and safety is part of the business, just like production and quality. Therefore, it should be managed in the same way as other aspects of business. This study investigated the safety culture and behavior between the labors, assess the implemented safety system and evaluate the surround environmental workplace. Field data were collected from different sources, i.e. questionnaire, interview, personal observation and documentary evidence. From collected results, the occupational health and safety measures implemented in some workplaces are not sufficient and some workers are dissatisfied with the current occupational health and safety measures. Health and safety should be the concern of each worker in the organization and this can only be achieved when serious training and education is carried out. Also, monitoring, inspection and evaluate existing health and safety measures on regular basis is very important for improvement and control the risk to achieve occupational health for the port man-power.

**Keywords:** *Safety; occupational health; incident; PPE.*

\*Corresponding author: Email: [samiramatarhse@gmail.com](mailto:samiramatarhse@gmail.com);

## 1. INTRODUCTION

In the past time, employers were not concern with the health and safety of their employees at the work. Safety and health equipment did not provided to employee and he risked getting hurt at work any time he goes about his duties [1]. Measures and strategies designed to prevent, control, reduce or eliminate occupational hazards and risks have been developed and applied continuously over the years to keep pace with technological and economic changes. Nowadays any organization of every kind are more concerned with their occupational health and safety (OHS) at work, by controlling their risks, improving their OHS policy and trying to reach higher objectives in this field. Many companies especially the biggest ones, recognized that a good OHS system has plenty of benefits for them as decrease of personal, productive and material loses, avoid penalties and problems with the law, improvement of company's image, improve profitability [2], save and protect human and facility resources in the workplace [3]. OHS is generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible effect

on the surrounding communities and the general environment [4]. It is also defined as the condition of being protected and saved against physical, social, spiritual, financial, political, emotional, occupational, psychological or other types or consequences of failure, damage, or any other events that could be considered hazardous [5]. Successfully managing health and safety in the workplace relies on commitment, consultation and co-operation. Everyone in the workplace needs to understand the need for health and safety, what their role is in making the workplace safer, and how they can fulfill their responsibilities and duties under the Occupational Health and Safety laws [6]. This study aims (1) to assess the worker's safety culture and behavior and (2) to evaluate the occupational health and safety system in the Damietta Port workplaces.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

Damietta Port located at 10 km to the west of the Nile River (Damietta Branch), 70 km to the west of Port Said and 200 km from Alexandria Port with total area 11.8 million m<sup>2</sup> (Fig. 1). Land area represents about 7.9 million m<sup>2</sup> and water area is



Fig. 1. A location map of Damietta Port, Egypt



**Fig. 2. Selected areas at Damietta Port, Egypt**

about 3.9 million m<sup>2</sup>. Percentage of water to land area is 1: 2. The channel is about 11.3 km long, 300 m wide and 15 m in depth. The River Nile connects to the port via barge channel 4.5 km long and 5 m deep. Width of the barge channel is 90 m. The Damietta Port connects to the main transportation network through railways and high way roads between Damietta and Mansoura. The Damietta Port is strategically located on the international transport lane as well as for domestic supply to Egypt.

- |   |                      |
|---|----------------------|
| A | Quality department   |
| B | General workshop     |
| C | Vehicles workshop    |
| D | Garage               |
| E | Zone 1 & 2           |
| F | Zone 3               |
| G | Zone 4               |
| H | Maintenance workshop |
| I | Marine store         |
| J | Marine area          |

## 2.2 Sampling and Analytical Methods

Safety culture and behavior assessment data were collected from questionnaire, interview, personal observation and documentary evidence. Ten (10) copies of questionnaire were distributed to nine (9) groups at different selected areas shown in Fig. 2. With this number the total copies of questionnaire administered were ninety (90). However, only sixty (60) copies of questionnaire in all were filled complete and returned.

## 3. RESULTS AND DISCUSSION

From Table 1, it was observed that the majority of respondent's ages are ranged from 36 to 45 years and by asking them about the period of employment in the DP, it showed that the most periods ranged from 11 to 15 years. The job categories of respondents were varied as shown in Table 2. Management is represented by only three persons. Ten respondents joined to engineering category. Technicians represented the largest percentage 50%. Some workers involved to questionnaire; six workers that represented 10% share in this questionnaire.



### 3.1 The Meaning of Occupational Health and Safety

The first question in questionnaire aimed to find out what the participants understand by occupational health and safety. The most answers (97%) (Fig. 3) directed to that they understand the occupational health and safety is welfare for employers, employees and third party. This shows that staff estimated that health and safety is a comprehensive issue to management, workforce, and considers the security of all other stakeholders as well.

### 3.2 Current Occupational Health and Safety Measures

This questionnaire find out from respondents some current occupational health and safety measures implemented in their work place. From Table 2 and Fig. 4, it can be observed that (22) respondents which represent 36.7% indicated that all choices in this questionnaire of occupational health and safety measures are implemented in their work place, but 15 respondents that represent 25% and this consider large percentage indicated that there are nothing of these choices of occupational health and safety measures are put in their departments. After searching it observed that the most of persons that represent 25% belonged to the older group of employees and this shows that

safety system wasn't implemented well before and there is noticed improvement in safety system relate to leadership changing, training of safety staff and employment of specialists in this field.

### 3.3 Satisfaction with Current Occupational Health and Safety Measures

This questionnaire aimed to measure the satisfaction of participants about the OHS system. In Table 3, it was observed that 36 respondents representing 60% indicated that they are satisfied with the current occupational health and safety measures in their work area, while 28.3% stated that they are dissatisfied with the current occupational health and safety measures in their work place. Only 4 respondents indicated that they are very satisfied and only 3 respondents choose that they are very dissatisfied with the current applied system of occupational health and safety measures (Fig. 4). By interact with the unsatisfied group; respondents stated some reasons that make them unsatisfied with safety system as irregular safety training, unsafe workplace, insufficient light and ventilation in their place, insufficient tools and equipment, lack of their managers or supervisors interest, irregular monitoring on health and safety, and unsuitable and uncomfortable protective clothing and equipment.

**Table 1. Age, employment period, and category of respondents**

Age	No	%	Employment period	No	%	Category	No	%
under 25	3	5	under 5	6	10	Management	3	5
26 - 35	15	25	6 – 10	16	26.66	Engineering	10	16.67
36 - 45	23	38.33	11 – 15	19	31.67	Specialist	8	13.33
46 - 55	16	26.67	16 - 20	13	21.67	Technicians	30	50
above 56	3	5	above 20	6	10	Workers/others	9	15
Total	60	100	Total	60	100	Total	60	100

**Table 2. Implemented current occupational health and safety measures**

Option	Number of respondents	%
New employee safety orientation and training program	0	0
Proper disposal of waste	2	3.3
Regular monitoring and inspection on safety, environment & occupational health standards and requirements	13	21.6
Using personal protective equipment (PPE)	4	6.6
Prompt reporting of accidents/injuries	2	3.3
Re-training on HSE practices	2	3.3
All the above	22	36.7
Nothing	15	25
Total	60	100

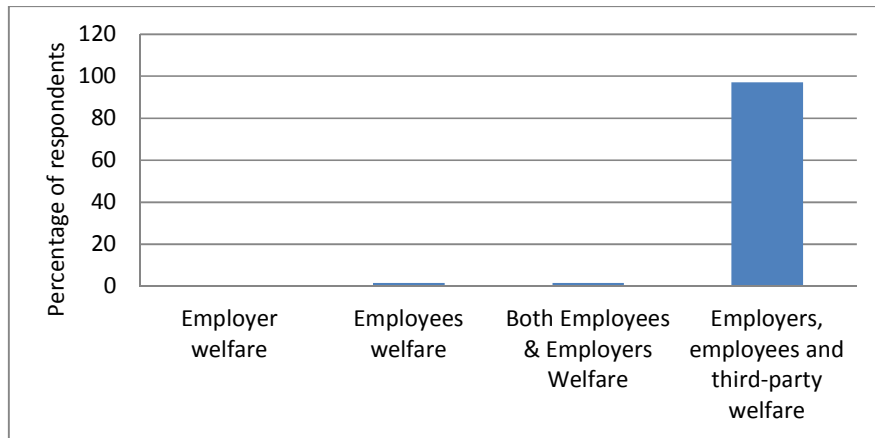


Fig. 3. A graph of the meaning of occupational health and safety

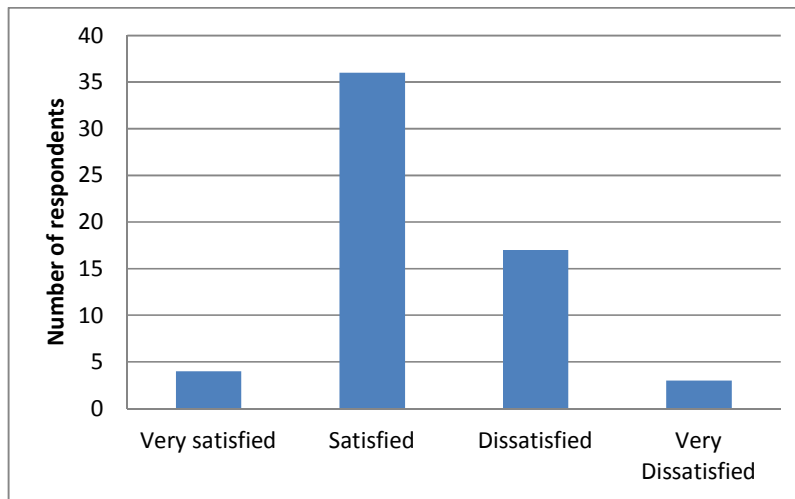


Fig. 4. A graph of satisfaction with current occupational health and safety measures

Table 3. Satisfaction with current occupational health and safety measures

Option	No	%
Very satisfied	4	6.7
Satisfied	36	60
Dissatisfied	17	28.3
Very Dissatisfied	3	5
Total	60	100

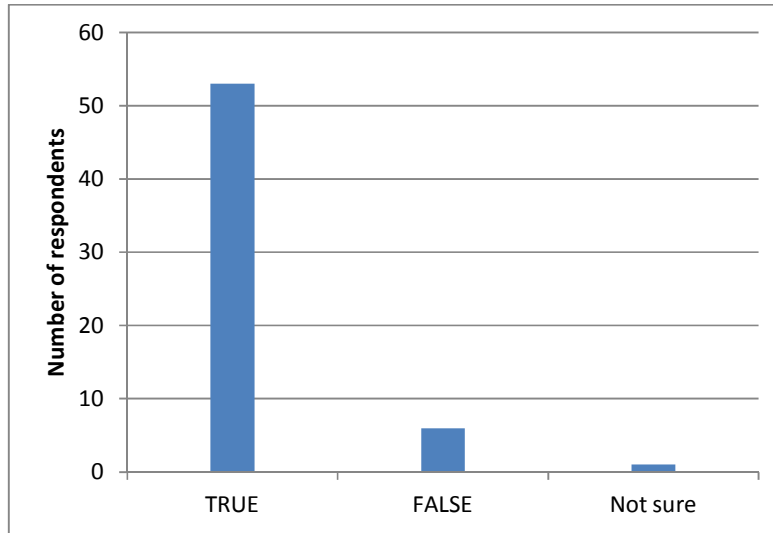
### 3.4 Responsibility for Occupational Health and Safety

A questionnaire that aimed to find out from respondents who the responsible of their safety and occupational health at the workplace. 3 respondents representing 5% of respondents

mentioned that safety and occupational health is the responsibility of the top management ultimately, but the most of respondents about 30% mentioned that their themselves are ultimate responsible for occupational health and safety. On the other hand, 16 respondents representing 26.7% mentioned that safety and occupational health is the responsibility of HSE department, whereas 14 responding labors about 23.3% showed that safety and occupational health is the responsibility of their supervisor. Only 9 respondents indicated that they are not sure about who is the responsible for occupational health and safety ultimately. By assessment of the mentioned above results, it is obvious that the Port staff realize the fact of their safety and occupational health is in their own hands.

**Table 4. Responsibility for occupational health and safety**

Option	Number of respondents	%
The top manager of DP	3	5
Yourself	18	30
Your supervisor	14	23.3
HSE department	16	26.7
Not Sure	9	15
Total	60	100



**Fig. 5. A graph of using of protective clothing**

### 3.5 Wearing Personal Protective Equipment

A question intended to answer if staff is required to wear personal protective equipment (PPEs) during duties.

From Fig. 5, it was observed the largest percentage of respondents about 88.3 replied that they are required to put on (PPEs) during their duty performance. This confirm and show that the Port staffs know the importance of commitment to put on their PPEs for their protection during job performing to avoid and reduce the accidents and injuries in the workplace.

### 3.6 Rights and Responsibilities of Employees and Employers

This question shows from responding workers if they agree with both employees and employers have rights and responsibilities to achieve effective safety and occupational health. All participants, i.e. 100% indicated that both

employees and employers have responsibilities and rights for effective occupational health and safety and they mentioned some responsibilities and rights of employees as wearing PPEs, reporting any near miss condition, and the right to refuse unsafe work or work in unsafe condition. Also they referred to some responsibilities and rights of employers as filing accident reports, maintaining records on health, safety and environment issues, and providing education and training on health, safety and environment. This point clarify that both employees and employers have responsibilities and rights to achieve effective and success occupational health and safety system.

### 3.7 Accidents and Injuries

Accident is unplanned, uncontrolled, and in some way undesirable. Accident prevention is one of the main objectives or practices of health, safety and hygiene section/committee [7]. Occupational accidents may arise from three dimensions, the task to be done, for instance malfunctioning machines, lack of protective equipment like

working conditions which arise from inadequate lighting, and fatigue that comes out of excessive working hours and the employee himself/herself [1]. This point in questionnaire states from each respondent if he suffered any accident or injury before since he was engaged in DP. From Fig. 6, it was observed that only 18 persons from 60 respondents answered that they suffered from accident before since they engaged to the port and this represent 30%. Whereas 70% of respondents have no any injury before in their work life. The persons who have suffered accidents/injuries stated some reasons of their accidents as lack of safety and health training, non-provision of appropriate PPEs, insufficient supervision, unsafe workplace as non-provision of suitable environment or appropriate tools and equipment and unarranged materials, and ignorance on health and safety instructions.

**3.8 Reporting of Accidents / Injuries**

This question aimed to find if the persons who suffered from any injuries or accidents reported this state to specialized authorities. It is clear from table 5 that only 4 persons from 18 injured persons reported their accidents to the appropriate authorities, while the most of respondents suffered accident or injury before didn't report this state. The respondents that reported their case indicated to some actions taken after reporting to prevent the re-occurrence as investigations of the incident, discussion of the accident cases in safety committee, reporting the case mentioning the direct and root causes, re-training of the exposed worker to the same case, and re-analysis and re-assessment of risks. We recommend in this item that any

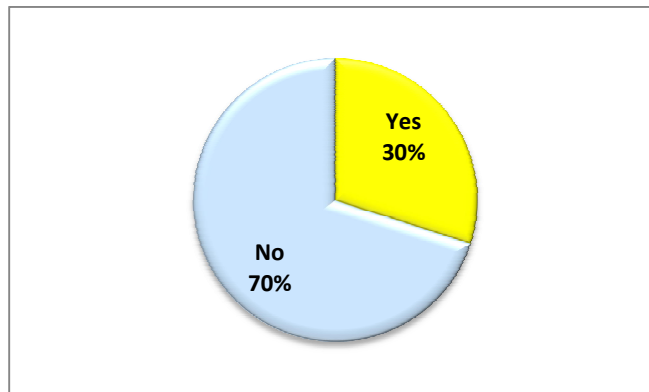
accidents or injuries cases supposed to the appropriate authorities to find solutions and avoid re-occurrence.

**Table 5. Reporting of accidents/injuries**

Option	Number of respondents	%
Yes	4	22
No	14	78
Total	18	100

**3.9 Safety Committee**

The key functions of safety committees are studying trends in accidents, etc, with the view to making suggestions for corrective actions, examining safety reports and making proposals for avoiding accidents, etc., examining and discussing reports from safety representatives, making proposals for new or revised safety procedures, acting as a link between the organization and the enforcement agency (the health and safety inspectorate), monitoring and evaluating the organization's safety policies, and making proposals for changes, it necessary [8]. By asking the participants about the safety committee, only 19 persons confirmed that DP has a safety committee but 35 persons have no idea about this committee whereas 6 respondents stated that they are not sure if the DP has a safety committee or not. By interact with the OHS responsible he stated that safety committee was hold monthly since 2010 till now according to labor law and this mean the disconnection between the labors and safety management responsible. The task of this committee is to handle all health and safety issues.



**Fig. 6. A graph of rate of accidents and injuries for respondents**

### 3.10 Training on Occupational Health and Safety

One way to encourage employee safety is to involve all employees at various times in safety training. Safety training can be done in various ways as regular sessions with supervisors, managers, and employees often are coordinated by HR staff members or/ and showing videos, television broadcasts and internet-based resources [9]. At this question, we seek for how occupational health and safety training is organized for staff. Five persons showed that training is organized on quarterly basis. Only 2 respondents choose biannually training. Three participants indicated that the training organized annually. The most participants (50) refer to no definite time for safety training Fig. 8. By asking Respondents about the topics which are discussed in safety training they listed some health and safety issues as electrical hazards, firefighting, Risk assessment, hazards in workplace and how to avoid it, and First aids. Also by asking about if HSE training has a benefit for them, 45 of respondents answered that this training is benefit for them but 15 of respondents answered no. It is obvious that the training on health and safety is not regularized in specific time for the labors at the port. It is very important for staff to be aware of training schedules on health and safety and participate fully in it and also it is important that the trainers must choose the topics that benefit each different group of workers.

### 3.11 Monitoring, Inspection and Evaluation of Safety Practices

This point aimed to find out if monitoring, inspection and evaluation of safety practices are important for effective occupational health and safety system. 70% of respondents strongly agree with this point (Fig. 8). This confirm that the participants believe strongly in safety role in work place.

By asking if there is a specific time for this inspection monthly, quarterly, biannually, or no definite time fixed, the most of respondents stated that monitoring, inspection and evaluation safety practices are conducted on irregular base and not in fixed time. It is important to conduct safety monitoring and inspection in a regular time according to scheduled plan for more improvement and achieve more effective system of occupational health and safety.

### 3.12 Impact of Effective Occupational Health and Safety Policies on Job Performance

This questionnaire indicated to the opinion about impact of safety policies on job performance. 14 persons think that the effective occupational health and safety policies have no impact on job performance. But 43 workers think strongly that effective occupational health and safety policies have impact on job. Only three respondents are not sure about this Fig. 9. By asking the group who agreed with the benefit of occupational health and safety policies about some benefits, they stated the following; safe the workers from any hazard, prevent or reduce the accidents and injuries, and provide safe workplace. Any organization cannot achieve its objectives without considering the health and safety of the workforce one of the most important priorities.

### 3.13 Health and Safety Policy

This question find out if the participants have in their unit or department a written copy of occupational health and safety policy of DP.

It is clear from the above data in Table 6 that 85% have a written copy of occupational health and safety policy in their unit or department, whereas 9 only have no written policy of occupational and safety. The compliance with government guidelines, regulations and laws is generally the primary focus of OHS policies [10,11].

Table 6. Health and safety policy

Option	Number of Respondents	%
Yes	51	85
No	9	15
Total	60	100

### 3.14 Securing Work Place against Fire

This point finds out if the different work places are secured against fire. Ten areas are selected to represent all the port from the north, south, east, and west. These areas are work shop, maintenance work shop, store, zone at 1, 2 berth, zone 3, zone 4, authority general garage, quality department, vehicles maintenance work shop, and marine environment area. By personal observation and documentary evidence it is observed that 9 from 10 areas are secured against fire with different types of firefighting equipment according to the type of potential fire



and these equipment are distributed in the place. Firefighting equipment in these places were powder fire extinguisher (6 kg, 12 kg, 50 kg), CO<sub>2</sub> fire extinguisher (6 kg, 10 kg, and 45 kg), 9 L foam fire extinguisher, 6 k automatic fire extinguisher, fire hoses in fire boxes, and fire hydrants. Zone 4 was not secured in sufficient way, where there was only one 6 kg powder fire extinguisher type despite of this building need 2 fire extinguishers of powder type that is suitable for solid materials fires and 2 fire extinguishers of CO<sub>2</sub> type for electrical fires according to Occupational Safety and Health Administration (OSHA) that determines the traveled distance to any fire extinguisher is not exceed than 22 m in light hazard condition.

### 3.15 Commitment to Wearing Suitable and Mandatory Personal Proactive Equipment

After make a site tour all over the selected areas, the workers in eight areas were not commit to the mandatory personal protective equipment (PPE). By asking and searching, some reasons cleared as ignorance of the safety instructions, the importance and the benefit of protective clothing, protective equipment are not suitable or fit for work nature, some workers stated that their protective clothing are not comfortable for them, and others referring to that they are not provided by any protective clothing.

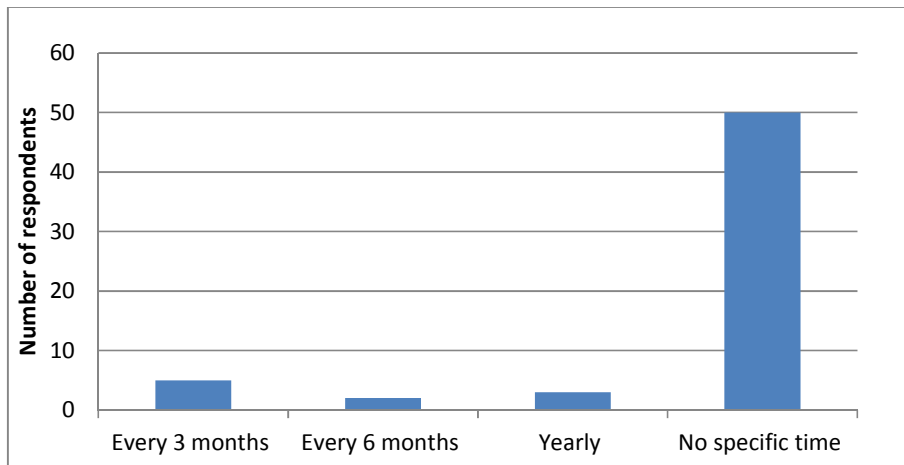


Fig. 7. A graph of training on occupational health and safety

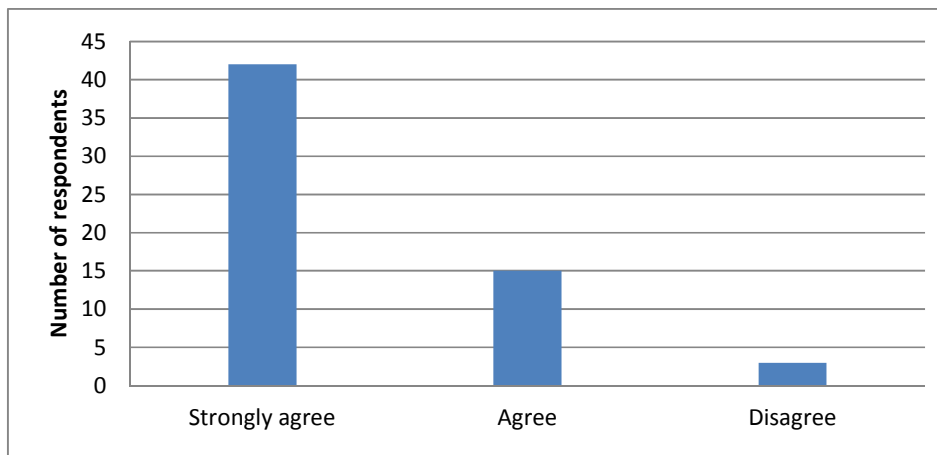


Fig. 8. A graph of opinion of monitoring, inspection and evaluation of safety practices

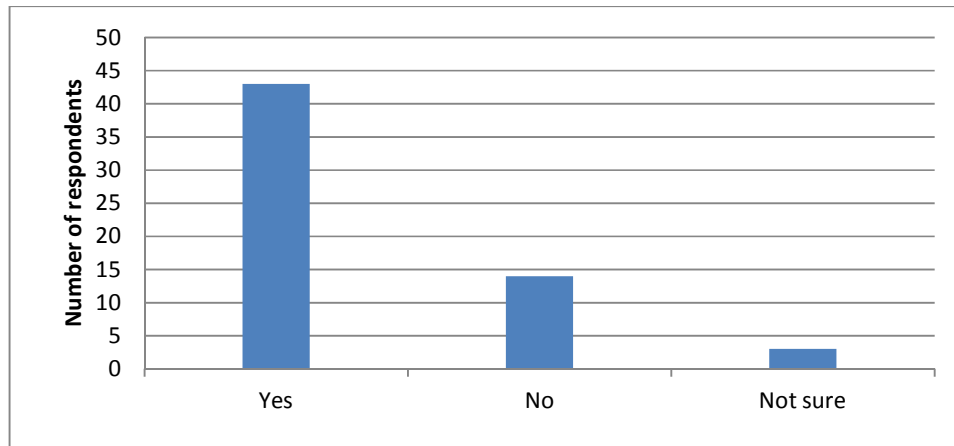


Fig. 9. A graph of opinion about impact of safety policies on job performance

Table 7. Commitment of the labors to PPEs

Option	Number of places	%
Yes	2	20
No	8	80
Total	10	100

#### 4. CONCLUSION

Any effective occupational health and safety policies can be achieved only if both employees and employers successfully achieve their respective tasks. Accident reports, inspection and maintain records, providing education and training on safety and health issues, posting safety notices and legislative data and information should be in the most priorities of the employers. Damietta Port has a safety committee that is conducted for creating a co-operation between the employees and employers by studying accidents trends to make suggestions for corrective actions, inspection of safety reports and making proposals to avoid re-occurrence of accidents, discussing reports obtained from safety representatives, making suggestions for new or revised safety procedures. The employees are necessary comply with safety and health rules and must know that the person himself is responsible ultimately for his safety and health. On the other hand, the employees have the right to reject any unsafe work. The Port staff should wear their protective equipment, use appropriate tools and equipment for safe performance of their work, and report any breaking of the law by management. PPEs must be applied to all workers and it must be comfortable, and suitable according to the type of the work and the size and this is responsible of the safety team. Accidents are costly both to the

organization and the worker, thus, great efforts must be made to avoid accident occurrence in the workplace. Accident investigation must be done to prevent reoccurrence of the accidents. Training on HSE items should be conducted in regular time to improve the culture of the labors. Monitoring, inspection and evaluation of the safety practices should be done and applied according to scheduled plan for more improvement and to achieve effective system. Work permits should be applied for all non-routine work to create the safety for the labors. Safe work instructions should be applied for all jobs and all sharing labors should be trained to be aware of the expected hazards and the control. Protecting workplaces against fire should be done according to the civil defense law. Environmental measurements must be in the consideration by regular inspection and take corrective and preventive action to protect the environment and the dealers. Hierarchy system must be considered to avoid the occupational health hazards as the operation can be cancelled if possible, or modified, or engineering controlled, or controlled by administration by job rotation or decreasing of work hours, and the last using PPEs. Noise, light, heat stress, humidity, and PM10 must be rotator measured to assess the workplace environment to be suitable for the labors. Air pollutants must be monitored due to the adverse health effect of these pollutants especially some pollutants concentration was exceeded than the threshold limit as CO and PM10 according to the environmental law no. 4/1994. It is recommended to monitor and measure the concentration of different air pollutants in the port regularly, to inspect and evaluate existing health and safety measures on regular basis for improvement and to assess,

analysis and control the environmental risk to achieve occupational health criteria and safety for the DP man-power as most of staffs confirmed that this forms an integral part of any effective health and safety policy.

## CONSENT

As per international standard or university standard written participant consent has been collected and preserved by the author(s).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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