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Research Paper

Worker Risks on Car Repair Shops and Protection Solutions

Murat ÇETİN*
** Department of Mechanical Engineering, Erzincan Binali Yıldırım University Erzincan 24109, Turkey*
***ORCID:** 0000-0003-0076-9648*

ABSTRACT
Introduction: *Several hundred accidents involving the car repair process and to hands or fingers resulting in injury occurred each year in The World. Many auto mechanicer were injured, injured or lost their lives while working in automotive workshops or carrying out off-site service calls. Every year, a significant number of people are dead by work accidents involving vehicles repair shops, and many more people are injured. Aim; The aim of the study was to assess the extent of work-related injuries and illnesses, access to first aid, use of Personal Protective Equipment (PPE), fire safety measures and hand hygiene practices among vehicle repair mechanicers.* ***Methods:*** *Better planning, training, awareness and by the appropriate use of equipments can avoid most of these accidents. The basic safety principles can be applied to other maintenance and repair process on vehicles and machines.* ***Results:*** *This study, describes safety several principles to distinct worker and mechanical fingers, hands, feets and body and car care equipments and that prevents touching the rotating fan and hot surface. In this study; occupational safety rules has been produced for worker and auto mechanic involved to reduce the chances of work accidents in the automotive repair shops.* ***Conclusions:*** *Vehicle repair service mechanicers and other workers need to be educated on the dangers associated with their work and the best practices to be adopted to to reduce or eliminate these risks and prevent accidents.*
KEYWORDS: *Vehicles, Maintenance, Injuries, Safety rules*

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I. INTRODUCTION

Several hundred accidents involving the car repair process and to hands or fingers resulting in injury occurred each year in The World. Many auto mechanicer were injured, injured or lost their lives while working in automotive workshops or carrying out off-site service calls. Every year, a significant number of people are dead by work accidents involving vehicles repair shops, and many more people are injured. Aim; The aim of the study was to assess the extent of work-related injuries and illnesses, access to first aid, use of Personal Protective Equipment (PPE), fire safety measures and hand hygiene practices among vehicle repair mechanicers. Definition of Work Safety, the series of measures to be taken to create a safe working environment in order to prevent workers from suffering work accidents is called occupational safety. Importance of Work Safety, in parallel with the industrialization and technological developments in the world and in our country, some problems have arisen regarding the safety of people working at workplaces [1]. Personal injuries, time loss, costs for compensation and negative impact on productivity are reasons why the industry needs to improve its trackrecord. All employees, contractors, maintenance personnel and visiting drivers must understand their responsibilities in the health and safety system [2]. According to the data of the Turkey Chamber of Mechanical Engineers(TCME) an average of 270 million work accidents occur each year in different business lines around the World (TCME) [3]. As a the International Labor Organization (ILO) reports, 2.3 million women and men around the world succumb to work-related accidents or diseases every year; this corresponds to over 6000 deaths every single day [4]. The first researches about workplace safety started in early 1880 and attracted great attention. The dangers of work are usually measured by the number of injuries or fatalities occurring to a group of workers, usually over a period of one year. Over the past century, such measures reveal a striking improvement in the safety of work in all the advanced countries. Around the world in the 1900s, worker safety was extraordinarily risky by modern standards, as production machines and power supplies were largely unprotected. From the beginning of industrialization, efforts to improve occupational safety started with the establishment of commissions by the states in the early 1840s. After the Second World War, the new powerful trade unions played an increasingly

important role in job security. As a result of the work of the work safety institutions, they contributed to the decrease in occupational accidents worldwide after 1970 [5]. Occupational accidents remain a very important problem for Turkey due to their social and economic consequences in 2018. The occupational accidents and occupational diseases cause in Turkey to lose 1500 lives annually and close to 4000 employees become invisible determined in Turkey. In our social security system, the economic damage caused by occupational diseases is over TL 4 billion per year. In addition, occupational accidents affect not only the working people, but also the all family and dependents and damages the citizens in material and moral sense[6]. Ceylan argued that in our country, an annual average of 74000 accidents is happening; at the end of this, 1152 employees lose their lives and 1888 employees are disabled for life. 98% of work accidents and occupational diseases are all preventable and the way to prevent them is education [7]. In the literature, Seth A. Gyekye and Simo Salminen defined education is usually characterized as a learning process through which people acquire knowledge and information, the development of cognitive capacities, and the transfer of norms, values and modes of behaviour. It is reasonable to assume therefore that workers' level of education would have important implications on the successful execution of their job assignments. As a result of this interest, shared perceptions are technically called the security climate about the safety values, norms, beliefs, practices and principles of the workers in the business environment. Research findings, including the relationship between the level of education and the frequency of accidents, are limited and uncertain [8]. The analyzes that turn into accidents and injuries, perception of security by giving proactive information about security problems were carried out to guide the management in the development of certain security programs. Proactive accident prevention methods compared to others, perception of safety by determining that their analysis is relatively low cost, security management is defined from the perspective of the employees by Raúl Payá Castiblanque [9]. Most accidents in motor vehicle repair(MVR) involve slips, trips and falls or occur during lifting and handling, and often cause serious injury. Petrol-related work is a common cause of serious burns and fires, some fatal [10]. Throughout the world, protecting employees against work-related accidents, injuries and occupational diseases has been a major problem and concern for employees, workers, governments, and the public for years [11].

It is not possible to eliminate an accident and work risk completely in a repair service but you can significantly reduce the risk of injury by providing regular training and requiring that technicians follow basic safety procedures on the job. It is possible to reduce the risk of injuries by following regular trainings and requiring prosedures that technicians follow basic safety procedures on the job by taking precautions. Because of automotive maintenance and repair work is carried out by the use of machinery, tools and chemicals, automotive repair and maintenance processes bring certain hazards to in the workplace. Services can never be completely risk-free, but the risks of work accidents and injuries can be significantly reduced by providing regular trainings and by ensuring that technicians follow the basic essential safety procedures. Antonio López analyzed to depending on institutionalization and the increase of authorized services, in the vehicle services was observed at the vehicle maintenance process decreasing to fatal accidents and serious worker injuries during the last years. This study has contributed significantly to analyzing the effects of factors associated with different types of injuries (superficial wounds, dislocations and sprains, bone fractures, concussion, and internal injuries, burning and freezing) in automotive repair shops and to preventing occupational accidents [12]. Literature data show that most accidents happen during corrective maintenance activities. According to the analysis of the French occupational accident database for 2002, it shows that accidents involving maintenance workers and construction workers. In contrast, several high-level studies indicate that education alone does not guarantee competence and effectiveness, and there is no relationship between education level and accident involvement [13].

II. METHODS

As a worker automobile mechanic repairs and overhauls cars and other automotive vehicles, or their systems and parts in car repair shops. An auto mechanic performs maintenance, diagnostic testing, repairs, and inspections of small trucks and cars. They work on engines, drive belts, transmissions, and electronic systems such as steering, brakes, vehicle bodywork and accident-avoidance systems. The operations in which an auto mechanic works on a motor vehicle, motor vehicle part or motor vehicle system are listed below [14].

- To examine or evaluate the general condition or performance improvement of the vehicle,
- Diagnosis and detection of vehicle malfunctions;
- Vehicle revision procedures,
- Disassembly and assembly of the vehicle for service and maintenance,
- Changing objects and adjusting emission settings to improve engine performance,
- Vehicle body and paint repairs,
- On the vehicle modifying, altering, installing or fitting work,

The equipment and the index of rules used in the implementation of the standard rules during the above maintenance services are explained.

III. THE ACCIDENT SITUATIONS IN CAR REPAIR SHOPS

Auto mechanicer examines vehicles, makes necessary repairs, replacements, adjustments, and presents the repaired vehicle to his superior or to the customer. Disassembly, assembly and manual handling injuries of vehicle parts are the most common types of injuries occurring in automotive workshops. The injuries occur by hand lifting heavy engine parts or as a result of the use of apparatus and equipment which are not suitable, heavy of vehicle parts lifting and prolonged postures in work. This kind of injury types occurs across all types of vehicle repair, maintenance or installation work, and on all types of vehicles. In order to determine risks, accidents should be systematically examined and risk reference groups should be identified and control surveys should be conducted in vehicle maintenance and repair services. In the car repair shops, the evaluation for accidents caused by vehicle lifting, disassembled or installed engine parts, test equipment and engine test benches shows that apprentices have a sixfold higher risk of having a serious injury than mechanicer and other workers. Separating work areas in repaired workplaces is an element of ensuring that mechanical work has limitations on risks affecting other nearby work and thus posing risks other than mechanical workers. Risks associated with the movement of pedestrians, as well as other employees from different departments in the vehicle repair service, whether they come to pick up vehicles, need to be managed by having clearly defined pedestrian paths, including the commuting areas in the workshop [15].

The employer is responsible for providing trainings to inform workers and worker representatives, taking into account the characteristics of the enterprise in order to ensure and maintain occupational health and safety. The methods of preventing health and safety risks, potential material and moral damages in the workplace are discussed with the workers and the principles of safe working, primary protection measures and the importance of periodic health examinations are explained. Although not frequent, there are good examples of such occupational safety education and training programs. Occupational safety education and training programs are carried out within working hours of the workers as required by law [16]. Employees who do not have occupational safety technical training are 2.5 times more likely to have an accident than trained workers. Literature studies have shown that that knowledge and experience with vehicle lifting, dismantled or installed engine parts, test equipment and engine test benches is an important factor in the possibility of serious injury. It must therefore be the goal to make the vehicle lifting, disassembled or installed engine parts, test equipment and engine test benches process as such safer. Further analysis shows that old machines and without a safety machines two or three times from the new and safety eqiupment and machines. Shops that operate old engine test and maintenance machines are three times more likely to have serious accidents.

IV. AUTO REPAIR PROTECTIVE EQUIPMENTS

4.1. Automechanic Work Dress And Clothing

The work clothes used by the automotive technician should have the necessary qualities both in terms of usage and occupational safety according to the characteristics of the work to be done besides the image like a professional. The physical structure of the technician's body should be taken into consideration and should be selected from shirts, trousers, overalls, jackets and belts. Work wear; tear-resistant and fireproof fabrics, coated button and padded knees to prevent scratching the vehicle bodywork, should be on the automotive garment. The trouser belt should be protectect against scratching on the vehicle bodywork. The mechanic must have work wear, long-sleeved shirts, long trousers that help protect the arms and legs from cuts, abrasions and burns. Abundant clothing that could be trapped in machines or equipment should be avoided, employees should collect long hair before working with the machine, the rings on their fingers and jewelry on their neck should be removed. All appropriate protective equipment, including safety glasses, chemical resistant workwear, gloves and knee pads, should be used by the repairer for safe operation. The employer is responsible for ensuring that the employees wear the necessary safety clothing and equipment. Abundant clothing that may be trapped in machines or equipment should be avoided, and employees should remove their long hair, finger rings, and neck jewelry before working. All appropriate protective equipment including safety goggles, goggles, chemical resistant workwear, gloves and knee pads should be used by the repairer for safe operation [17].

Overalls, work shirts, work trousers, overalls, jackets and high-quality workwear with high comfort and durability should be used. For auto mechanics, industrial workers, working in the shop or just about anywhere on your feet demands good work footwear. Besides durability, safety toe, non slip or waterproof work boot at the same times stylish footwear need to be look good as good off the job as it does on. The automotive service and repair industry, including vehicle dealerships, independent service and repair shops, quick lubes, muffler shops, tire installers, fleet specialists, and truck repair centers in terms of occupational safety, it is have to use qualified work shoes. No work shoe or boot made of full pure leather can be 100% waterproof, but it shulld be as close to water proof as is possible [18].

When a good work glove is used, extra grip and precision are provided on the fingers and inside the hand, making it easier to hold bolts and tools in tight spaces. The auto mechanics gloves were not just designed for work safety or mechanical people to keep from cutting and hurting themselves, but they were also produced

to keep doing the job for a long time. Work gloves should a non-slip grip and excellent protection for every task. Auto mechanic gloves are designed to protect hands from the harsh elements of auto repair while leaving workers tactile senses intact to do things. The gloves provide protection for mechanics against dirt, grease and the general roughness and irritation that can be caused from handling car-parts. The work gloves can be used for any machinery maintenance including cars. Work gloves help give you additional grip without reducing dexterity, perfect for keeping hold of tools while dealing with oil and lubricants. Gloves help to keep oil off hands from machine oil, , at the same time eliminating the need to spend ten minutes for hand clear at the end of the working day. Work gloves also help reduce the irritation and pain that working with hands for long periods can cause, which reduces the chances of annoying forming on hands of worker and skin of worker. As a mechanic's job can be very varied, he must use different types of gloves to cope with different needs. Dry gloves are designed to hold parts that need to stay dry for use in dry environments. High visibility gloves are designed to be easily visible day and night and are perfect for roadside work where visibility is essential. Thermal gloves are lined inside and is perfect for working in cold test facilities and cold climates and cold environments. Cut resistant gloves are designed to work with sharp objects or parts, such as protecting sharp metal components that can be found under the hood of a car. Some technicians using low-level mechanical work wear disposable latex gloves to protect their hands. While these types of gloves prevent oil from staining hands and provide protection against calluses, these gloves are not useful when working because they are not resistant to sharp objects and are slippery in oily jobs [17, 18].

4.2. Safety For Chemical, Electrical and Fire Risks in Car Repair Shops

The safety and usage information of all chemicals in the auto body must be correctly labeled. Safety data and using sheets should be created for all existing chemicals. There must be an eye wash for workers in case of emergency room in the workplace. All employees need to know the electrical equipment, electrical machines, electrical installations, their location, and how to use them in an emergency. Use of worn electrical wiring and any electrical equipment must be stopped and repaired to prevent electric shock and electrical fires. The service life of all fire extinguishers in the auto repair shop should be checked regularly. Employees in the auto repair shop should be trained on the proper use of fire extinguishers and appropriate techniques for combating different types of fires, and periodically applied fire drills. It is necessary to ensure that the fire extinguishers' usage dates are marked, checked and charged each month. A workshop evacuation plan should be prepared in case of an emergency fire and it should be ensured that this plan is known to all workers. According to emergency procedures, emergency exits should be clearly marked and the doors of the emergency exit doors must always be kept open and tidy.

4.3. Safety For Fire Risks in Car Repair Shops

According to the fire data of workplaces, automobile repair shops are at the head of the most common fire-risk workplaces. At the same time, workplace fires are also one of the most expensive disasters. Preventive measures aken to protect businesses against fire include the most basic activities to reduce the possibility of a large fire. These type businesses must be developing risk improvement solutions, including at fortifying fire protection practices and together with a fire safety specialist against fire. A clean autocar service is a safe business area. Auto repair shops should always carry out a high level of cleaning, clean daily waste and waste and remove spilled oil residues using absorbent materials. In order to reduce the possibility of spontaneous combustion, oily wipes used for cleaning should be stored in metal storage containers with self-closing lids. Vehicle parts and other ancillary equipment by safety storage practices help to prevent fires and therefore storage must be done wisely. It should be ensured that flammable, combustible liquids are stored in approved flammable liquid storage cabinets, and that such liquids are kept away from ovens, hot places, and heat sources such as water heaters. Stored or changed old tires should be stored in areas away from combustible materials and potential sources of ignition. As a result, most importantly, the negative effects that may prevent the storage spaces from accessing fire extinguishers and other fire prevention equipment should be avoided. For vehicle bodywork repairs, effective hot working procedures should be implemented to prevent flammable materials from catching fire during sparks and cutting. Boxes or tanks where materials such as dyeing products, thinners and solvents are stored should be kept clean, their closures must be securely and tightly closed. For fire protection, it is necessary to implement official policies and programs on occupational safety and to implement sustainable safety programs. Personnel must fully trained in safety and fire extinguishers.

4.4. Safety for Electrical Risks in Car Repair Shops

Proper use of electrical equipment is important for fire risk. For this reason, it should be ensured that all electrical equipment and tools used in auto workshops are properly grounded and electrical leakage tests should be performed at periodic intervals. Vehicle battery charging equipment should be checked, maintained and isolated in the presence of flammable materials. The extension cords must be checked, and they must be in good

condition. Another danger is that attention should be paid to keeping the portable electric heaters away from materials containing fire risks.

4.5. Workplace Habits

Safe workplace habits can greatly reduce the risk of accidents and injury in the automotive repair industry. Therefore, regular safety training and equipment training should be provided in the workplace To avoid any legal problems such as labor law, vehicle insurance and vehicle warranty periods, trained and certified technicians should be allowed to repair the vehicles and care must be taken. The regular and clean floor of the auto repair shop minimizes the risk of tripping and falling to machine parts, reducing the risk of accidents. The "wet floor" markings should be used after cleaning the work floor or after spilling oil or liquid [19]. When a vehicle or equipment needs to be repaired, a warning sign or label must be used to ensure that employees do not accidentally use it. Employees should not be allowed to smoke in or near the workshop, as per both safety and workplace rules.

4.6. Danger, warning and caution safety Labels and Signs in Car Repair Shops

Automotive repair workshops must fulfill their responsibilities regarding written and visual printed information and warnings in order to provide mandatory occupational safety information and safety protocols for drivers and especially repairmen. Effective communication, information and sustainability minimize the risk of work accidents, save lives and reduce workplace liability problems. A labelling error or a faulty spare parts and faulty equipment used can potentially cause serious injury. Sensitive and high-quality safety warning posters are essential to avoid dangerous situations and ensure the safety of customers and employees. Lack of information about careless behavior or working environment is open to many possible dangers. In order to eliminate these dangers, reminding factors should be placed as much as possible and necessary warnings should be made. Loud warning at workplaces is difficult, time consuming and disturbing. Therefore, safety and warning signs are of great importance. Safety signs are very important in any business environment, not only a requirement for the total quality of the workplace and bu aolso their display in the workplace is also a legal obligation. The primary importance of displaying Safety Signs is to prevent injuries and ensure that staff, customers and visitors are aware of possible dangers and hazards in certain situations and/or environments. Safety warning signs consist of signs that give serious information about whether an accident should be considered before an accident occurs or how to deal with it if an accident occurs. Complying with safety and warning signs keeps and workers away from dangers in terms of occupational health and safety, minimizes risks. Workers who are actively working in care care workshops constantly face increasing security problems over time. At the same time, they constantly warn employees about the necessary information and safety instructions for hazards. Safety signs and symbols not only report the presence of hazards, but also help build sustainable safety awareness among employees. As a result; production, heavy industry, construction sites, office-based environments and auto repair shops are crucial as they result in a more pronounced reduction in workplace accidents. Figure 1 shows, the signs of danger, warning and caution, which includes not only a symbol but also a short educational descriptive title. As a sign word; danger indicates a hazardous situation that, if not avoided, can result in death or serious injury. Warning; indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Attention; indicates a potentially hazardous situation that may result in minor or moderate injury (https://www.safetyinfo.com/safety-signs-and-safety-labels-workplace) [20].

4.7. Safety for Clean Air Risks and Lighting in Car Repair Shops

Depending on the operations carried out in motor vehicles repair shops, workplace air is polluted by various pollutants. Their activities include sanding, cleaning, and painting, all of which may release pollutants into the air and may contribute to health concerns in the shop and in the community. The best vehicle repair shops implement pollution prevention strategies not only to comply with government laws, state, local and regional laws, but also to further reduce impacts on human health and the environment. On the other hand, lighting in the workplace is one of the most common physical risk factors, and lack of lighting in the workplace is one of the major factors that generate occupational accident risks [21]. Lighting guidelines prepared in relation to the measurement of lighting in the workplaces, the design of lighting, the use of appropriate lighting equipment and the conditions of the workplace should be followed. Inadequate and inappropriate lighting creates physical risk factors in the workplace and lack of lighting is one of the most important factors that create work accident risks. Lighting guidelines prepared in relation to the measurement of lighting in the workplaces, the design of lighting, the use of appropriate lighting equipment and the conditions of the workplace should be followed.

Figure 1. Danger, warning and caution safety signs[20]

4.8. Before Maintenance Precautions for Working on Vehicles

There is always a risk of electrical accidents in auto workshops due to electrical wiring hazards, electric shocks and malfunctions from electric machines. Electrical components of vehicles, electrical tools and even vehicle batteries are the main sources of danger. All employees of motor vehicles should be made aware of the fact that they are properly licensed and that they are required to wear seat belts while driving motor vehicles. During maintenance and repair work, apply the parking brake and lock both wheels with safety wedges before starting work on a vehicle. Ignition keys must be removed before carrying out any mechanical work and the battery must be disconnected before the maintenance process on the vehicle's electrical system.

4.9. Safety For Chemical Risks in Car Repair Shops

Automobile repair shops contain many hazards that can cause burns, punctures and accidents resulting in electric shock. Automobile mechanics usually work in service garages where they can fall down stairs or elevated platforms, fall into inspection pits, fall onto or fall onto wet, slippery or oily floors. Auto mechanics are at risk of serious injury due to faulty garage equipment such as jacks, moving vehicles, heavy parts falling on their feet, or tire blast. Automechanics often carry heavy transport parts, such as disc rupture or hernia, such as trauma, back and low back pain that causes work in the body posture. It is the responsibility of every workshop owner to protect the health and safety of their employees and it is the employer's duty to provide safety training and to comply with safety regulations. An auto mechanic isconfronted with working with different chemicals and heavy equipment and is obliged to know and apply the safety rules to protect against the safety hazards that they will encounter at work. Updated and sustainable information should have obtained about the risks that may occur in an auto repair shop and safe working practices that can help prevent occupational accidents. As a result, maintenance operations such as engine, transmission and differential repairs and replacement of oils in the workshop, the floor of the workplace becomes dangerous and slippery in the garage floor because of the effect of slippery oil. The accumulation of waste oil stains on the floor can cause injuries as a result of employees slipping and falling, as well as chemical vapors can produce respiratory diseases. Crash and fall accidents can minimized by eliminating the tools used in the repair process and automobile parts that occur during the repair process. In addition, non-slip safety boots on the floor prevent falls and at the same time protect the feet. Gloves need to use for protect workers from thermal, chemical burns, irritation, sharp engine parts and faulty equipment and other hazards. Further protection of hands, skin and eyes is required because there is always the possibility of exposure to hazardous chemical acids, antifreezes, brake hydraulic fluids and oil spills without safety equipment to the required standards. The most important action against these risks is to control the power supply, electrical installation and machinery to be used before repairing any equipment. All chemicals that been

exposed to the skin and mix into the ambient air and inhale must be clearly identified and presented with poison control data and relevant information banners. Special attention need to paint to operational risks, including special hazards such as paint and chemical components. An approved paint spray booth with automatic fire extinguishing equipment should be used for vehicle body painting.

V. RESULTS AND DISCUSSIONS

In this study, the security procedures that need to be done to ensure sustainability in work and worker safety in auto repair shops are explained. The risk of fatal accidents and permanent disabilities due to neglect of protective measures taken by car mechanics in workplaces repairing motor vehicles is high. The study also shows that safety education enables research collaboration with the concepts of interdisciplinary research, vehicle repair and worker safety rules. Based on the safety training preliminary results, it is demonstrated that workers of different levels of pre-knowledge were presented with a head start in their safety by the advantages of using of safety eqipments education. Research shows that improved occupational safety is possible in maintenance and repair operations performed on or under vehicles as a result of compliance with occupational safety rules. Health and safety strategies and accident prevention measures should be personalized and adapted to the type of worker likely to be injured in each type of accident. Increasing participation in small firms in occupational health and safety training courses designed according to the worker profile will improve working conditions. It is very important to implement the non-smoking policy in the workplace, which is important for the health of workers employees, and to raise awareness among employees. Taking into account the hazards and defects that occur during vehicle maintenance and repair operations, weekly regulation, correction and control programs should be implemented. In order to maintain occupational health and safety awareness, Occupational Health and Safety posters should be hang on the wall at the relevant places in the workplace.

In order to minimize the risk of occupational accidents at work, employees should be periodically trained, informed and safe working conditions must be made habit. Generally family themed banners are a good way to accept the principles of safe work.

• Although the integration of safety with automotive mechanicer education is important, it has not been sufficiently wide spread in the workplace. Nonetheless, developing notable efforts for an extensive integration may be the next challenge in the Turkish Automotive Industry sectors.

• Automotive industry acts in the global market, and therefore, it is imperative that the workers should be prepared to work everywhere in the world where their experience is needed. The same difficulties for teaching classical safety in vehicle works raise the risk factors raise for healthy environments as well.

• This learning methodology will provide employees with an integrated and sustainable applied vision of different safety rules for the vehicle maintenance process.

• As with any job, the lifelong learning process applies to motor vehicle repairs, and implementing feedback information to ensure continuous learning assessment, safe work processes and continuous improvement in methodologies will contribute greatly to job security.

• Employers must include safety responsibilities in job descriptions and in training, raise safety issues in day-to-day contact with employees, and display safety notices and risk assessment results. By law, employers have a general duty to ensure that the health and safety of their employees and workers in automotive repair shops are protected.

VI. CONCLUSION

The operations carried out in workplaces that carry out motor vehicle maintenance and service are a labor-intensive sector, and it includes many risk factors (such as dust, chemicals, toxic gases) in terms of occupational health and safety. Therefore, employees are exposed to both physical and chemical hazards during production. The most important element of a business is human resources. The basic conditions for the sustainable success of the business are that employees are physically and mentally healthy and feel happy by running their jobs in an environment of trust and peace. A social security culture should be established in order to improve occupational health and safety at workplaces.

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