THE HAZARDS AND PROTECTIVE SOLUTIONS INTURNING OPERATION

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Abstract - In order to highlight the importance of paying attention to the bylaw which clarifies the protective ways for human resources as national capital in the face of the health hazards of the work environment, including toxic and harmful pollutants, different forms of physical factors, mechanical damages as well as work-related diseases in turning and related processes, the present article investigates the subordinate related issues. We can conclude that the freelancers ought to heed the protective guidelines to avoid the dangers and be aware of the hazards.

Keywords - Human source bylaw, health hazards of the work environment, harmful pollutants, turning.

I. INTRODUCTION

One of the manufacturing processes by which the piece is cut to the desired shape is calledturning.Machine tool is the main device used in this order and it is driven by an electric power that receives from an electromotor, and this force is transmitted to the main axis of the shearing tool by using the belt and the gear belt and it gives it either a circular or linear move.Since most of the car parts of industrial and commercial machines have circular sections, can be produced by machine lathe. On the other hand, due to the cheapness and high speed of turning than the others methods. The use of lathe is a commonly used technique in the industry. [9] With regard to the various risks of turning operations, which place various types of harmful chemical, physical, ergonomic and safety hazards as a potential set. Also according to the number of workers who are working in the different industries and workshops all over the country, it is essential that hazards of this operation is clarified and then the appropriate controlled measurements for each of these is determined. It is obvious that the establishment of sanitary control alone is not enough and the achievement of high health performance in these activities depends on the efficiency of the planned controls, therefore, monitoring and measuring the harmful factors as a complementary measure is necessary to ensure the effectiveness of the planned controls.[1] The amputation of the body is one of the most severe and most malignant occupational injuries. There are many different and diverse work equipment and activities in the workplace (the US Bureau of Statistics' annual report notes that there were about 10,000 defects in all industries) half of the workforce defects pertains to the industry sector and the other half related to construction, agriculture, wholesale, retail activities and service of industries.The crushing of the hands and feet, the cutting of fingers, the blindness and so on are the possible damages caused by the machinery. It seems that many of the risks come from moving parts of machines that are of a variety of types, hence the protection to protect workers from preventable damageis necessary. The bylaw shows the reported amount of workers' complaints, lost working days, the expenses of compensation in an industry and machinery foundry. So in order to promote the safety and health level, it is essential to detect all the operation hazards, then control them to reduce the discussed risks. [3], [5] To preventdisasters of working by milling machine some principles must be observed: Wear tights, remove necktie and scarf, cover long hair by snood, milling machine should be tested in an inaction mood, disable the milling machine while cleaning and greasing it, cover the edges of threesystem pins with the protective warhead, use a particular support while changing three systems, utilize a protective maskduring milling the fragile goods, apply broom or prong to collect brushes, not to come close to vertiginous milling machine edges, do not hold by hand the rotating shaft connected to the machine, lean the loose end of the shaft on the roller, do not touch the rotating part of the machine. [3], [5] Before milling, the birdie and grateshould be fixed in their places appropriately. While assemble or disassemble the three and four systems (overhaul), just put upon hand power. The exploitation of rotating machine power is unsafe. Before assemble or disassemble the three systems, put an especial wooden board on the machine rail, not to damage machine rail. Immediately after fixing, the especial threesystemswrench should be taken. Measuring the task or adjusting the lathe machine while task is being operated is a big mistake. For long milling (long shafts), especial tools (workbenches or belt) should be used. During filling, the fie haft should be kept in the left and its head in the right hand. [5] To adjust the height of the blades inthe stylus,especial layers should be used and the lathe machineshould be fixed at least by two screws in workbenches. One should not bend too much on the work, because there is always risk of throwing

brushes due to lathe. The operator should use protective glasses and safety footwear. Operator should report any types of technical deficiency in the machine to his administer or safety authorities. The machine should be equipped with the earthling system. The operator should obey safety, health, ergonomics rules in the correct way of lifting and carrying weights. Three-system wrench and other reparation tools should not be left on the ground. Rotating parts like gears, straps and chains should be protected properly. The operator should be a trained person with a personnel card with job description, he should be obligated to obey its rule.

II. REVIEW OF LITERATURE

Tian, Shirinzadeh, and Zhang's (2009) paper [8] presents the methodology for modeling and control of a high precision flexure-based mechanism for ultra-precision turning operation. A high performance piezoelectric actuator is used to driven the flexure-based mechanism. A parallel flexure hinge mechanism is utilized to guide the moving platform and to preload the piezoelectric actuator. A high resolution capacitive sensor is used to measure the displacement of the flexure-based mechanism for closed-loop control. With consideration of the driving circuit, the dynamic model of the flexure-based mechanism has been established. The effect of the driving circuit on the dynamic response of the precision mechanism is investigated. Experimental tests have been carried out to verify the established model and the performance of the flexure-based mechanism.From the analysis, it was noted that the time constant RC can change the dynamic characteristics of the flexure-based mechanism, i.e, the overshoot and the settling time of the flexure-based mechanism will change with various time constant RC values.

In Sata, Li, Takata, Hiraoka, Li, Xing, and Xiao's (1985) view [6] thesurface roughness generation in a turning operation is examined by using a FFT analyzer. It is found that the roughness profile of a workpiece is composed of several periodical components: the cutting tool feed component, the spindle rotational error component, and the chatter vibration error component. A block diagram of surface roughness generation in a turning operation has been drawn to give a clear illustration of the process. To examine the origin of these error components, a series of cutting tests were carried out with different spindle bearing arrangements and with different types of workpiece material. It has been shown that the method presented in this study is very helpful in evaluating the machinability of workpiece material and also in diagnosing the conditions of the machine tool spindle system. As cited byShiraishi and Sato in 1990,[7] the dimensional and surface roughness controls in turning have been achieved by a newly developed measuring system based on an optical technique. The aim of these controls are not only to keep a size deflection within a given tolerance but also to make a smoother surface by removing local irregularities during machining. The control strategy is focused on a Rmax value because of the simplicity of the control system design. The dimensional control is implemented with a reference diameter level of 1/2 Rmax roughness by the regular cutting tool, while in the roughness control a compensatory flat bite tool is used to remove surface irregularities. To begin with the dimensional control is achieved, then the roughness control is followed immediately after the dimensional correction. The control results demonstrate an improvement of surface roughness together with dimensional assurance. Kirby, Zhang, Chen and Chen's paper [4] in 2006 presents an application of the Taguchi parameter design method to optimizing the surface finish in a turning operation. The Taguchi parameter design method is an efficient experimental method in which a response variable can be optimized, given various control and noise factors, and using fewer experimental runs than a factorial design. The control parameters for this operation included: spindle speed, feed rate, depth of cut, and tool nose radius. Noise factors included varying room temperature, as well as the use of more than one insert of the same specification, which introduced tool dimension variability. A total of 36 experimental runs were conducted using an orthogonal array, and the ideal combination of control factor levels was determined for the optimal surface roughness and signal-to-noise ratio. A confirmation run was used to verify the results, which indicated that this method was both efficient and effective in determining the best turning parameters for the optimal surface roughness. Dimla'spaper [2] in 2002 describes a tool-wear monitoring procedure in a metal turning operation using vibration features. Machining of EN24 was carried out using coated grooved inserts, and on-line vibration signals were obtained. The measured tool-wear forms were correlated to features in the vibration signals in the time and frequency domains. Analysis of the results suggested that the vibration signals' features were effective for use in cutting tool-wear monitoring and wear qualification.

III. CHEMICAL HAZARDS

There are limited chemical factors in the working environment of the turning.Their presence is dependent on the type of work. Since in lathe it is possible to lathe different parts, so the air pollutants created in this environment will be also different. It is natural in iron, iron and steel that very fine iron particles are dispersed in the environment.Fortunately, these metals are high in density and these mainly produced particles are heavy in the operation of the machine and therefore they

quickly deposit on the ground and floor of the workshop.However, due to the rotational rapid movement of work pieces, these particles are thrown at high speed and therefore, they will be present in the air for a short time and are likely to breathe them by the person who runs it or any other personnel present on the site. Although the inhalation of powder or iron oxide particles is not dangerous in toxicology and the absorption of these particles in the lungs does not cause a hazardous disease of the lung fibrosis, but these particles accumulate in the lung, and in the radiography colored patches like those in fibrous diseases such as silicosis and asbestosis is created.
This phenomenon will be more hazardous in the rolling of alloyed metals that contain heavy elements such as chromium, cadmium, lead or other heavy metals.

IV. MECHANICAL HAZARDS

- **Risk of throw**

At this risk, small and coarse objects are scattered around by a large amount of energy, and in their paths they can cause damages after being hit by persons or other objects. And if they enter your eyes, they can cause a lot of damage. The most commonsignsare: pain, irritability, harsh redness of eyes. The external object is usually visible with unarmed eyes. Of course, sometimes anexternal object is very small and gets stuck under the eye lid, which then only can be seen by ophthalmologist examination.

- **Mechanical hazard of sticking**

This mechanical risk occurs when an object is moving and the other is immovable, or both movable with sharp edges and rough levels that can stick to the skin or cloth or if the operator has a bracelet or watch or a ring, it can create a risk for the operator.The mechanical risk of stuck itself may not be so dangerous, but it's possible to bring the person to other dangers.This danger exists in the lathe (in the region of the three systems and the piece is fixed to three systems).

- **Danger of crushing**

This risk is caused by two moving objects that one of the objects may be immovable and the other movable or both movable, so that the moving object is approached to the fix one between 2 and 12 inches, or two objects become closed to 2 to 12 inches, but the two objects do not reach the point of contact.Now, if your arm or leg or other organs of the body placed between the two objects, there is the possibility of exacerbation.

The crush is seen in machines that have a horizontal moving table or, in other words, it has back and forth movement.Like a plate machine. Now, if the distance between the end of the course's back movement and the adjoining wall or the adjoining caris not considered, it is possible to squash someone between the table and the wall if a personis at this distance.

- **Hazards of the hot and cold surfaces**

This mechanical risk is also called shock factor, which means that the person suddenly suffers from shock. And maybe he will be hurt.Hot or cold surfaces may not solely be so dangerous, but it leads to other dangers.Solution in this type of danger is mainly, if possible, using an increase in distance or insulation action; or the construction of an enclosing fence in line with the pertinent mechanical risk.

- **Ergonomic Dangers**

Turners often have to work in a permanent posture, so observing the points to prevent musculoskeletal complications is necessary. The following guidelines can play an important role in reducing the improper body posture of turners and causing symptoms of musculoskeletal disorders. The provisions of these guidelines can be as follows. Avoid inappropriate physical conditions that can cause fatigue, reduced concentration, and even reducing the quality of the turning work. Stop working in a standing or sitting position and in a short period of time, change your working condition. Set the level of work to the elbow height as much as possible. Use a suitable chair that has rear and height adjustment. If it is unavoidable for a long time, it is better than the underlying ones which have a flexible and springy mode (such as wooden pallets).

To prevent repeated bending of the waist, put the tools and materials as much as possible in reach and at the height of the waist.For transportation and handling of heavy items use mechanical tools such as Pallet Truk and the TrollyTruk or ceiling brush.When working, the wrist should be positioned with a suitable angle with the horizon, so that the wrist does not bend to the sides.After 1 hourof working,change your position and rest for 11 minutes. [3]

CONCLUSIONS

Education has always been a major pillar of health and hygiene. The basics of working with the tools and equipment and the risks associated with working with them as well as the toxicity of chemicals and noise risks, and chemical agents, along with the risks of working under inappropriate ergonomic conditions, should include the essential headings in the training program. Unfortunately, most work-related illnesses do not have definitive treatment, but they should be noted, fortunately, most of them are predictable and preventable. One of the important tools that, in addition to measuring and assessing health hazards in the workplace, such as determining the concentration of chemical pollutants, can be very beneficial to start

working as a result of the start of protective measures in the early detection of ailments.

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