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HAZARD IDENTIFICATION AND RISK ASSESSMENT IN A LEATHER INDUSTRY

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Abstract:
This project mainly discusses the prevention of hazards. It describes methods for eliminating hazards at source or for reducing them, and ways to protect against them by using fixed guards. Hazard Identification and Risk Assessment (HIRA) method is used to identify the type, cause, and effect of the potential risks fort the activity sequences. Identification of the hazards and assessment of the risk is a prime requirement in the Occupational Health and Safety Assessment Series (OHSAS 18001) management system. Performing hazard identification and risk assessment in the critical activities helps the management in developing the appropriate preventive and control strategies to protect the machinery, operating personal and environment. This paper aims at the probilistic and consequence analysis based on the identified hazards prevailing in the operation and maintenance of workplace handling lignite in leather components. In Workplace facilities quick and efficient transportation meets the hazard in work environment. During the operation and maintenance of such plant, machinery and operating personal are exposed to a variety of hazards and risk which can result in damage to equipment, injury to personal and degradation to the environment, if uncontrolled. Hence the environment health and safety is the absolute necessary to prevent accidents with the help of hazard identification and risk assessment.

Key Words: Risk Assessment, Safety Implementation, Occupational Health and Safety Assessment Series

Introduction:

Over time the leather has become a luxury item of essential substance. Increasing leathers and leather goods. The danger and the need to indicate that the growth of this sector has great opportunities. The worldwide trade of leather industry was 116 in 2006. Has risen to 116.5 billion. It was just 4 billion in 1971. Increased labor costs and environmental concerns in developed countries in the late 1970s and 1980s were the number of units in developed countries. Leading to ratification. Most of the leather products are located in Kolkata, Chennai, Kanpur, Delhi and Pondicherry. India, the world's largest leather products and! India is the fifth largest supplier of leather products and accessories manufactured in India, such as Coach, Bear Cardin, Weiss St. Laurent, Eden Aini Jaafri Beni, Harrods, Marks &Spencer, Lys Californian, Geese, Next. In developing countries such as Indonesia, Thailand, India and China, it facilitates the growth of skin industries, and now, India's share of global imports and global trade in every year has seen a sharp growth. The leather industry is one of the top 10 export earners in the country. A workplace risk may hurt you maybe. There are risks to any type of work and workplace. Everybody in the workplace: Workers, managers and employers have the responsibility to identify and control the dangers of everyone. For workers, the first step is to recognize what is (or whatever) a job risk is to tell the employer. For the employers, the first step is to inform workers about potential risks, and to create control systems to reduce the risk of injury. But do not you know what to expect? What is a workplace risk however? Workplace Risk Types, There are five types of risks in every industry and every workplace. Here are a list and introductory explanation for each of them.

- **Physical:** Dangerous Dangers Things that can communicate with the body or possibly touch with possibilities for removal. Slippery surface, noise level and vibration, temperature in the area of work as physical hazards in the assembly and sewing work area and pressure.
- **Chemical:** Chemicals are everywhere around us. naturalor manufactured, fluids! Gases, spirit, solid or particles (very small pieces) can be in shape. Naturally occurring and productive chemicals are harmful to people working around them. Chemical contingencies in the leather bench area where leather products are assembling and sewing work Compressed gases, solvents, Adhesives, sewing machine friction oils.
- **Biological:** biological risks are usually the poisonous substances produced by the organisms or diseases that cause viral or humans to transmit diseases or diseases to bacteria and humans. This is happening because it does not follow the safe workstations currently in place or work in areas where there are no secure work practices or do not implement them.
- **Ergonomics:** Ergonomic risks arise due to the design and operation of ergonomic work environments.

As a result of ergonomic disruptions, wounds always affect muscles and depression. These are the most common work injuries, but suddenly these injuries occur, but often they are very long-term. Ergonomic Risks Uncomfortable Body. Look at jobs that include appearances (keeping the body in same position for long periods, paying more body weight or lifting or carrying the embarrassing weight), and repeating high-risk jobs (the same movements for a long time). Disorganized or poorly designed workstations, tools and equipment are also part of ergonomics risks.

Psychology - Community Based Risks:

The psycho social risks arise from different distinct ways when people interact with each other. Such risks, such as tapping, violence or sexual harassment can be seen as negative work conditions. It may be due to stress or out- of-emphasis on the workplace, the nature of work done or the attitudes and behavior of different people coming to work, psychological and

community risks to harm our health and mental health and safety and workplace health and safetyWatch.

Literature Survey:

Nicholas Chartresa, Lisa A. Beroa, Susan L. Norrisb Published a paper the title, "A review of methods used for hazard identification and risk assessment of environmental hazards" This paper indicate that conducted a cross-sectional content analyses of all publicly available relevant resources of selected national and international organizations that perform HI and/or RA of environmental hazards. We use the term 'organisation' to refer to each organisation, agency, office, unit or department included in our study. The processes and methods used by organisations conducting HI/RA of environmental hazards are inconsistent. There is a need for empirically based tools and methods to be adopted for the evaluation and synthesis of evidence and the formulation of conclusions across all organizations that conduct HI or RA.

Liesbeth Jacxsensa, Mieke Uyttendaelea, Bruno De Meulenaerb published a paper on the title "Challenges in risk assessment quantitative risk assessment" This praper will explain these methodologies demonstrated with ITP trainees. Within the International Training Program 'ITP food safety, quality assurance and risk analysis' of Ghent University, department of Food Safety and Food Quality, we developed for low and middle income countries and emerging countries a training module on risk assessment risk assessment can be performed qualitative (risk ranking) or quantitative (deterministic or probabilistic), depending on the nature of data available and also the questions to be answered. With quantitative risk assessment, the risk of infection caused by microbiological hazards or impact on human health of chemical hazards can be calculated for a certain population, or subpopulation (e.g. infants, elderly). However, with limited data available and good knowledge of food chain, modeling basic risk assessment calculations can be conducted.

Mwinyikione Mwinyihija, Norval J C Strachan published a paper on the title" Ecological Risk Assessment of the Kenyan tanning Industry "This study confirmed that elevated levels of specific chemicals/properties (chromium, phenols, BOD, COD,SS) were responsible for the observed effects downstream rather than upstream. This pointed to the tannery site as the source of stressors. In addition, the use of biotests and biomass activity was complemented with chemical analysis, which quantified the stressors and their effects in the ecosystems. These parameters answered the risk questions initially raised and concluded that, firstly, the river water was affected by the tannery effluent discharge and, secondly, the river sediment health was affected by the deposition of the contaminants. It is necessary in future studies to integrate life cycle assessment and include other trophic levels (producers and secondary consumers) to provide a wider perspective in the ERA.

William H. Farlanda,, Angela Lynchb, Neeraja K. Erraguntlac, Lynn H. Pottengerd, published a paper on the title Improving risk assessment approaches for chemicals with both endogenous and exogenous exposures. In a risk assessment context, highlighting the importance of quantifying increments of dose from all sources of the same or similar chemicals interacting with biological targets; understanding the influence of endogenous chemical concentrations on disease risk; and assessing total dose to targets in evaluating risk from incremental environmental exposures. The concept of the exposure has highlighted the need to address individual exposures in the broader context of a lifetime of endogenous and exogenous exposures. Terje Aven, published a paper on the title Risk assessment and risk management Review of recent advances on their foundation This paper is to perform a review of these advances, with a special focus on the fundamental ideas and thinking on which these are based. Special attention will be devoted to contributions that can be seen as a result of an integrative thinking process, a thinking which per definition reflects a strong "ability to face constructively the tension of opposing ideas and instead of choosing one at the expense of the other, generate a creative resolution of the tension in the form of a new idea that contains elements of the opposing ideas but is superior to each"

Poojawadekar, Varun Gopinath, Kerstin johansen published a paper on the title safe Layout Design and evaluate of a human robot collaborative application cell through risk assessment a computer aided approach This paper will also discuss how simulation Could contribute in eliminating the threats as required by the safety standards before investing in equipment for collaborative cell layout. implementation of the task- based risk assessment process along with a 3D simulation tool as an aid different aspects of the layout, both performed at an early phase of design to finally give the required safe design layout and the operational procedure Sunaryoa, Mochamad Aditya Hamka published a paper on the title Safety Risks Assessment on Container Terminal Using Hazard Identification and Risk Assessment and Fault Tree Analysis Methods. The study is aimed to conduct safety assessment that can be used further for minimising work accidents at the port. Hazard Identification and Risk Assessment (HIRA) method is used to identify the type, cause, and effect of the potential risks based on the activity sequences. HIRA was used to identify hazards that have highest risk level, and FTA was used to search for the root causes of those was used to search for the root causes of those hazards.

Fangyi Yang a, Huasen Wan b, Tiezhu Li published a paper on the title The research of the hazard identification and risk assignment front of the vehicle based on machine vision. In this paper, studying the hazard identification and risk assignment front of the vehicle, using the object detection and tracking technology to identify the object, and estimating the tracked object's motion parameters, assessing their risks and warning. The results of the research have certain significance to the automotive active safety automotive driver assistance systems can effectively assist the driver and reduce traffic accidents, and it is the basis of intelligent vehicle, so it attracts a large number of research scholars.

Methodology:

Hazard Identification and risk assessment vary greatly across industries, ranging from simple assessment to quantitative analyses with extensive documentation. To be effective, the organization's procedures for hazard identification and risk assessment should take account of the following:

- Hazard
- Risk
- Controls
- Documentation

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Haazrd Identification:

Hazard identification should aim to determine proactively all sources, situations or acts, arising from an organisation activity, with a potential for harm in terms of human injury or ill health. Examples include

- Source [e.g. moving machinery]
- Situations [e.g. working at heights]
- Acts [e.g. manual lifting]

Hazard identification should consider the different type of hazards in the work place includes:

- Physical
- Chemical
- Biological
- Psychosocial

The following sources of information or input should be considered during the hazard identification process:

- OH & S Policy
- Monitoring data
- Records of incidents
- Reports from previous audits, assessments or reviews
- Input from employees and other interested parties
- Information from employee OH & S consultations.
- Process review and improvement activities in the workplace.
- Hazard identification should consider all persons having access to the workplace. [e. g. customers, employee]
- The hazards and risks arising from their activity.
- Their behaviour

Human factors, such as capabilities, behaviours and limitations, have to be taken into account when evaluating the hazards and risk of processes, equipment and work environment. In considering human factors, the organization‘s hazard identification process should consider the following and their interactions:

- The nature of the job.
- The environment.
- Human behaviour.
- Psychological capabilities.
- Physiological capabilities

Risk Assessment:

Risk is the combination of the likelihood of an occurrence of a hazardous event and the severity of injury or ill health that can be caused by the event or exposure(s). Risk assessment is processes of evaluating the risk(s) arising from the hazard(s), taking into account the adequacy of any existing controls and deciding whether the risk(s) is acceptable.

Risk Assessment Inputs:

Inputs to the risk assessment processes can include

- Details of location(s) where work is carried out.
- The proximity and scope for hazardous interactions between activities in the work place.
- Security arrangements.
- The proximity of other personnel who might be affected by hazardous work.
- Details of any work instructions, system of work and/or permit to work procedures, prepared for hazardous tasks.
- Instructions for operation and maintenance of equipment and facilities.
- The availability and use of control measures [e.g. for ventilation, guarding].
- Environmental conditions affecting the workplace.
- Details of access to and adequacy of emergency procedures, emergency escape plans, and emergency equipments, emergency escape routes, emergency communication facilities.
- The findings of any existing assessments relating to hazardous work activity.
- Details of previous unsafe acts either by the individuals performing the activity or by others.
- The duration and frequency at which tasks are carried out
- The accuracy and reliability of the data available for the risk assessment.
- Risk assessment should be conducted by a person(s) with competence in relevant risk assessment methodologies and techniques and appropriate knowledge of the work activity

Risk Assessment Methodology:

- A risk assessment should be detailed enough to determine appropriate control measures.
- Some risk assessment methods are complex and appropriate.
- The risk assessment should involve consultation
- With and appropriate participation by workers and take into account legal and other requirements.
- Regulatory guidance should be taken into account where applicable.

Determination of Need for Controls:

- Having completed a risk assessment and having taken account of existing controls, the organization should able to determine whether existing controls are adequate or need improving.
- If new or improved controls are required, their selection should be determined by the principle of the hierarchy of

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controls. i.e. the elimination of hazards where practicable followed in turn of risk reduction with the adoption

Consequence Analysis:

Any major or minor release of a hazardous material has every possibility of culminating into an accident. The basic principle of consequence analysis lies in quantifying the consequence in terms of damage distances of an accident that can take place by the release of a hazardous material. In certain cases, this is also referred to as Maximum Credible Accident and Consequence (MCAC) Analysis. In practice, however, the selection of accident scenarios is made on the basis of

- Past accident analysis
- Engineering judgment and
- Expertise in the field of risk analysis studies

As an initial step in any study, a selection has to be made of the processing/storage units and activities which are believed to represent the higher level of risk for the surroundings in terms of damage distance. For this selection, the following factors have to be taken into account

- Properties of the material.
- Quantity of material present in a unit or involved in activity.
- Process or storage conditions

Risk Assessment Scenario:

The various activity, hazards and adequacy of control measures followed in the leather industries, I have been analysed. The risk estimation and risk control measures are identified as shown intable

Colour	Score	Risks	Action
	16 & Above	High	Operation not permissible Stop operation & Review controls
	10 to 15	Medium	High Priority remedial action Proceed with extreme caution & safety at all times. Implement additional (secondary) controls immediately, Review within 30 days, Emergency control measures shall be in place.
			Take remedial action at appropriate time proceed with care, Additional control is advised, Review shall be implemented within 90 days
	1 to 9	Low	Risk acceptance: Residual risk if possible, risk reduction should be further considered, particularly severity. There are no imminent dangers, Frequent review shall be in place especially changes in procedures, materials or environment.

Action Table:

Risk Level Determination – 5 x 5 matrix

Severity:

	Critical (5)	Very Serious (4)	Serious (3)	Marginal (2)	Negligible (1)
Frequent (5)	25 Opeartion Not Permissible	20 Opeartion Not Permissible	15 Review at Appropriate Time	10 Review at Appropriate Time	5 Risk Acceptable
Moderate (4)	20 Opeartion Not Permissible	16 Opeartion Not Permissible	12 Review at Appropriate Time	8 Risk Acceptable	4 Risk Acceptable
Occasional (3)	15 Review at Appropriate Time	12 Review at Appropriate Time	9 Risk Acceptable	6 Risk Acceptable	3 Risk Acceptable
Remote (2)	10 Review at Appropriate Time	8 Risk Acceptable	6 Risk Acceptable	4 Risk Acceptable	2 Risk Acceptable
Unlikely (1)	5 Risk Acceptable	4 Risk Acceptable	3 Risk Acceptable	2 Risk Acceptable	1 Risk Acceptable

Conclusion:

The hazard identification and risk assessment procedure have analyzed the possible hazards and mitigation measures pertaining to emergency situations and disaster. The Company has a well-designed plan regarding safety procedures and it has the capability to deal with any kind of emergency situation as per the need. The Occupational and Safety hazards are also dealt well as the company believes in the safety of employees first.

References:

1. Nicholas Chartresa, Lisa A. Beroa, Susan L. Norrisb Published a aper on the title, "A review of methods used for hazard identification and risk assessment of environmental hazards"
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