The present work was submitted to the Faculty of natural Resource and Environment

Bachelor thesis

“OHS factor analysis and probability to control selected types of incidents: Case study MAK LLC”

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Statutory Declaration

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I hereby affirm in lieu of an oath that I provided the submitted bachelor thesis

“OHS factor analysis and probability to control selected types of incidents: Case study MAK LLC”

I did not use any sources other than those stated. In case that the work is additionally submitted on a data medium, I declare that the written and the electronic form are completely identical. The work was not submitted in the same or similar form to any examination authority.

Ulaanbaatar/Nalaikh, 5/17/2023	Narangarav
Place, Date	Signature

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Abstract

This case study investigates the connection between occupational health and safety (OHS) and the costs incurred by an organization, with a particular emphasis placed on direct labor, and it suggests strategies for cutting both direct and indirect costs. The research is carried out at Mongolyn Alt (MAK) LLC, which currently has Occupational Health and Safety Management System (OHSMS) being broadly adopted throughout the organization as a whole. The purpose of this project is to highlight the significance of OHS in lowering the costs that are associated with worker injuries and, illnesses and minimizing the impact on the production process. As part of the research, we will be looking at international OHS standards and developing standardized documentation that is specific to the Mongolian setting. The research recommends one change as a way to illustrate how the influence of a single variable can have a lasting effect on production costs and volume. At MAK LLC, the long-term objective is to eliminate expenditures that are linked with workplace injuries and to foster an atmosphere that is both sustainable and productive in the workplace.

Nomenclature

- ILO International Labour Organization
- ISO International Organization For Standard
- KPI Key Performance Indicators
- MAK Mongolyn Alt
- MSDs Musculoskeletal Disorders
- OHS Occupational Health And Safety
- OHSAS Occupational Health And Safety Assessment Series
- OHSMS Occupational Health And Safety Management System
- PAS Publicly Available Specifications
- PDCA Plan, Do, Check, Act
- PPE Personal Protective Equipment
- TS Technical Specifications

1. Chapter 1

1.1. Background and objectives of the study

The objective of this study is to address the increasing significance of OHS measures and the associated costs and benefits of implementing ISO 45001 in a construction company located in Mongolia. OHS is defined as a set of procedures and practices aimed at ensuring employee safety and well-being in the workplace. OHS encompasses a wide range of measures, including the identification and evaluation of potential risks and hazards in the workplace, such as physical, chemical, biological, and ergonomic risks, and their control or elimination. These measures include the provision of personal protective equipment (PPE), the implementation of safety protocols and procedures, the provision of training and education, and the regular conduct of inspections and audits to ensure compliance with safety regulations.

OHS measures are of significant benefit to both employees and employers and require mutual efforts to conform to requirements and meet needs. Effective and well-designed OHS measures protect employees from harm and illness by preventing workplace accidents and injuries, which can be severe and even life-threatening. Additionally, OHS ensures that employees can work without being exposed to risks, which enhances productivity by reducing accidents, injuries, and illnesses. OHS measurements aim to create a positive and supportive work environment that fosters productivity and teamwork. Since accidents and injuries result in significant costs for employers, including lost productivity, workers' compensation claims, and legal fees, an effective OHS program does not only build workplace atmosphere but also minimizes unnecessary costs. Safe and comfortable workplaces increase a company's reputation, recognition, and ability to attract and retain employees, as well as build positive relationships with customers, suppliers, and the wider community. All companies must comply with laws and industry-specific OHS regulations to protect their employees.

In this chapter, we will examine the important topic of workplace safety and the international standard ISO 45001, which provides guidelines for OHSMS. Specifically, we will focus on the risk factors that can lead to unsafety in the workplace and how ISO 45001 can be used as a standard to identify and classify these risks. It also argues that this standard should be used as a measure to minimize the risks when the overall benefits (financial, market extension, reputation, legal compliance, etc.) outweigh the costs of putting the measure into effect. To be more precise, the research chooses the one factory and has little experience implementing ISO 45001 in certain subsidiaries while attempting to apply the standard in all of its subsidiaries, including the parent

company. I have done a short among MAK LLC's subsidiaries, implemented OHSMS successfully, to summarize the advantages in order to substantiate the claims regarding implementation's benefits.

1.2. Research Questions

- What is the rationale behind companies adopting ISO 45001?
- What benefits does the implementation of ISO 45001 provide to an organization, and how does it impact the socioeconomic landscape?
- How effective is ISO 45001 in reducing the probability of selected types of incidents, such as workplace injuries or illnesses?

1.3. Limitations of the study

ISO 45001 is viewed as the main management tool and means to attain the company's objectives related to OHS. The company has developed a business and strategic plan with the goal of becoming an industry leader in terms of market size, quality assurance, and reputation both within and beyond the industry and among customers. With a growing number of organizations implementing ISO 45001 in recent years, there is a need to provide documents that outline the general concept, company-specific objectives for implementing the standard, and actual costs and benefits based on the selected case. Thus, this study is anticipated to be among the first studies conducted in Mongolia on the implementation of ISO 45001 in the construction industry. Additionally, the attitude of the subsidiary company towards the standard is a significant factor, considering that the parent company is taking the lead in its implementation. The study has following limitations:

- Due to confidentiality concerns, the company did not provide access to the relevant data. Therefore, the study relied on online job vacancy positions, which for instance using engineering positions' salaries to approximate the expenses.
- The majority of the data and information utilized in this study is acquired through a professional internship that is constrained in both duration and scope.
- The subsidiary company chosen for the study is relatively new compared to other companies in the construction industry, and therefore there is limited information available on workplace injuries, accidents, harm, and employee turnover. Although some incidents were reported during open discussions and interviews with staff during the workshop and internship, they were not well documented and were classified as having minimal impact on workflow and company business. To gain a better understanding of employees' attitudes and awareness, a small survey was designed and conducted among

line managers, operators, and other staff who were willing to express their opinions on the implementation of ISO 45001 and its influence.

Despite the named limitations, the study offers important insights into the probability of controlling particular types of events in the context of MAK LLC and OHS factor analysis. To improve the robustness and generalizability of the study findings, future research should consider overcoming these limitations. The results should be viewed with caution.

1.4. Organization of the study

The report is structured into five chapters. The first chapter introduces the reader to the background of OHS and highlights its significance for organizations. The second chapter provides an overview of OHS, OHS management, and factor analysis, as they relate to the organization. The third chapter describes the methodology used for collecting and analyzing data, including the techniques utilized to determine the OHS factor effect and evaluate the data. In the fourth chapter, a case study is presented to illustrate the OHS factor analysis and the probability of its effect, which examines the existing OHS measures within the selected company. Finally, the fifth chapter presents the study's conclusion, which summarizes the findings and insights derived from the research.

2. Chapter 2

LITERATURE REVIEW

This section focuses on official research where the main topic: " OHS on the workplace" is defined and selected research studies and official publications that focus on:

1. OHS and ISO 45001
2. Costs and benefits of implementing ISO 45001, and
3. Official documents that establish the legal and regulatory frameworks on OHS. This literature review section concentrates on official documents and research studies that center on the theme of " OHS in the workplace." The goal is to provide an overview of the legal and regulatory frameworks on OHS, as well as examine the benefits and costs of implementing ISO 45001. This review leads to the thesis topic, which is a case study that examines the implementation of OHS and ISO 45001, along with its costs and advantages, in one of Mongolia's largest mining and production conglomerate's subsidiary companies.

2.1. Definition and Concepts of occupational health and Safety

2.1.1. What is Occupational Health and Safety?

International Labor Organization (ILO) (2010)[1] defines that "*Occupational health and safety (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 impact on the surrounding communities and the general environment.*"

The term OHS covers a vast array of measures and practices that are informed by multiple specialized fields and are consequently defined in diverse contexts. The concept of occupational health and safety is a broad concept that seeks to achieve several objectives. These objectives include promoting and maintaining the optimal physical, mental, and social well-being of workers, improving working conditions to prevent adverse health effects, protecting workers from risks that may be detrimental to their health, and implementing best practices to minimize expected risks and designing policies, tools, and measures to manage any potential risks that may arise in the workplace.

[1] Alli. B, Fundamental principles of occupational health and safety. Geneva: International Labour Office; 2008. Available from: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_093550.pdf

The source also identifies *OHS study as an extensive multidisciplinary field, invariably touching on issues related to scientific areas such as medicine – including physiology and toxicology – ergonomics, physics and chemistry, as well as technology, economics, law and other areas specific to various industries and activities.* (1)

One of the fundamental goals of the ILO is to protect workers from sickness, disease, and injury brought on by their jobs. The concern for worker protection has grown over time to assume a wider range of core goals reflected in the ILO Constitution and the Declaration of Philadelphia. The following guidelines were established by the 1984 International Labor Conference Resolution on improving working conditions and the environment[2]: *Work should take place in a safe and healthy working environment; conditions of work should be consistent with workers' well-being and human dignity; work should offer real possibilities for personal achievement, self-fulfilment, and service to society.* (2)

2.1.2. The functions of elements that contribute OHS

ILO's continuous efforts and initiatives are confirmed by the fact that between 1919-2007 roughly half of the 188 Conventions and 199 Recommendations adopted by the ILO Conferences directly or indirectly address the issues of OHS and approved new conventions whilst updating and renewing the existing conventions. And the main provisions being discussed to reflect the changes in the workspace followings are some up-to-date instruments:

- Protection of Workers' Health Recommendation, 1953 (No. 97)
- Occupational Safety and Health Convention (No. 155), and Recommendation (No. 164), 1981
- Occupational Health Services Convention (No. 161), and Recommendation (No. 171), 1985
- Prevention of Major Industrial Accidents Convention (No. 174), and Recommendation (No. 181), 1993
- List of Occupational Diseases Recommendation, 2002 (No. 194)
- Protocol of 2002 to the Occupational Safety and Health Convention, 1981 (No. 155)

Promotional Framework for Occupational Safety and Health Convention (No. 187), 2006, and Recommendation (No. 197), 2006 (1)

The Convention (No 155) defines that national system for OHS is an infrastructure that provides the main framework for implementing the national policy and underlines the importance of formulation and implementation of national programme including objectives, achievable within a predetermined time frame, priorities, and means of action formulated to improve OHS and

[2] Occupational Health (Occupational Safety and Health). [cited 2023Apr11]. Available from: https://www.ilo.org/safework/areasofwork/occupational-health/lang--en/index.htm

means to assess progress. The national preventative safety and health culture is also defined in the Convention and it is a culture in which the right to a safe and healthy working environment is respected at all levels, where government, employers, and workers actively participate in securing a safe and healthy working environment through a system of defined rights, responsibilities and duties and where the principle of prevention is accorded the highest priority. (3)

Government's role:

The government is responsible for designing and adopting a national OHS policy and program, which includes both general and industry-specific laws to govern OHS. By laws and procedures are developed by designated government organizations to ensure compliance with the legal and regulatory framework. All companies must have OHS documents that identify specific risks, plan preventive measures, and budget ahead. OHS policies should involve input from employers and workers' respective organizations. The competent authority should periodically review regulations and codes of practice, conduct hazard research, provide advice, and take measures to avoid potential risks. (4) The OHS policy should include provisions for establishing and extending occupational health services and workers' health surveillance systems.

Employer’s responsibilities:

In the legal and conceptual framework, the responsibilities of governments, employers and workers is to be seen as complementary and mutually reinforcing in the common task of promoting occupational safety and health to the greatest extent possible within the constraints of national conditions and practice.(1)

Those in charge of risk generation and in a position to remove or reduce hazards have responsibility. A duty of care should be applied in the following relationships: employer to employees, employer and self-employed to others, principal contractor to subcontractors and their employees, host employer to labor hire workers, franchisors to franchisees and their employees, and those who plan, design, manufacture, supply, import plant, substances, and other goods, workplaces, and work systems.(5)

The above stipulates that everyone is responsible for safety and health and accident/incident prevention and in general four “entities” are identified to be accountable and responsible for the OHS effort:

i. All levels of management must demonstrate their commitment to the company’s policies and procedures regarding safety and health by their presence, visibility, actions, adherence, and behavior.
ii. The person who, by background or experience, has been assigned responsibility and therefore assigned accountability to ensure that the company’s safety and health program is adhered to.

iii. The supervisor, who models the company's safety personality and is the liaison between management and the worker relevant to the implementation of safety, must be held both responsible and accountable for safety in his/her work area.

iv. Employees are responsible for abiding by the company's rules and policies and are accountable for their own behavior, safe or unsafe. (6)

Employee's rights and responsibilities:

Workers' rights to life and health at work are increasingly acknowledged within the structure that specifies employees' and employers' OHS obligations and rights. Decent work means safe work. Workers must also protect themselves and others who may be affected by their actions. This implies a right to proper knowledge and a right to stop work in imminent threat to safety or health. Workers must grasp job hazards to protect themselves. Thus, they should be advised of risks and educated to work safely. Workers and their representatives must work with employers on preventive programs to improve workplace safety and health.(6) Since employees are victims of systematic and unsystematic risks like noncompliance, accidents, and injuries at work and on routes defined as part of work space, their primary responsibilities are awareness, compliance, and active and efficient participation in the employer's measures to reduce risks and increase compliance.

2.1.3.Aims and Functions of OHS Service

Employers are responsible for worker health and safety under the ILO Occupational Safety and Health Convention (No. 155) and Occupational Health Services Convention (No. 161). An occupational health service protects and promotes workers' health, improves working conditions and the working environment, and maintains the enterprise's health by providing occupational health services to workers and expert advice to the employer on how to achieve the highest possible health and safety standards in the interests of the specific working community. ILO Convention No. 161 and Recommendation No. 171 envision occupational health care as interdisciplinary, comprehensive, and preventive but also curative. The texts above and national laws and programs advocate a phased implementation to adapt occupational health activities to national and local needs and conditions. An occupational health service should create and follow an enterprise-specific program of activities. Its functions should match the enterprise's occupational hazards and health concerns, with special attention to the sector's issues. An occupational health service's main functions are listed below.(7)

The main functions of occupational health services are to:

1. identify and assess workplace health hazards;

2. watch for factors in the work environment and working practices that may affect workers' health, such as sanitary installations, canteens, and employer-provided housing;
3. advise on work planning and organization, including workplace design and the choice, maintenance, and condition of machinery, equipment, and substances used in work;
4. and participate in the development of programs for the impromptu (1)

2.2. Types of incidents and their causes, risk assessment

2.2.1. Types of incidents

The ILO defines; an incident is any unplanned event that causes injury. (8) A dangerous occurrence is any event that could have caused injury, but did not. The term “incident” will be used to describe both incidents and dangerous occurrences. (Understanding the different types of incidents that can occur in the workplace is important for developing effective prevention strategies and ensuring the safety and well-being of employees.)

There are several types of incidents that can occur in the workplace. Here are some of the most common types:

1. Accidents: Accidents are incidents that result in an injury or damage to property. Examples include slips, trips, and falls, machinery accidents, and electrical accidents.
2. Near misses: Near misses are incidents that could have resulted in an injury or damage to property but were narrowly avoided. Examples include a tool falling from a height and narrowly missing a worker or a piece of equipment malfunctioning but not causing any harm.
3. Hazardous incidents: Hazardous incidents involve exposure to hazardous substances, such as chemicals or radiation, that can result in health problems or damage to property.
4. Occupational illnesses: Occupational illnesses are illnesses that are caused by exposure to workplace hazards, such as dust, fumes, or noise. Examples include respiratory problems, skin conditions, and hearing loss.
5. Work-related stress: Work-related stress is a type of incident that can result in physical or mental health problems, such as anxiety, depression, or cardiovascular disease.
6. Violence: Violence is a type of incident that involves physical or verbal aggression, harassment, or assault. It can be caused by co-workers, clients, or members of the public.

The outcomes of incidents can be classified into two primary classifications, namely, occupational injuries that are fatal and non-fatal in nature. The following data presents the incidence of occupational injuries, both fatal and non-fatal, per 100,000 workers in Mongolian statistical

records. The total number of two distinct categories of occurrences demonstrates a consistent annual fluctuation within the range of 20 to 30. (9)

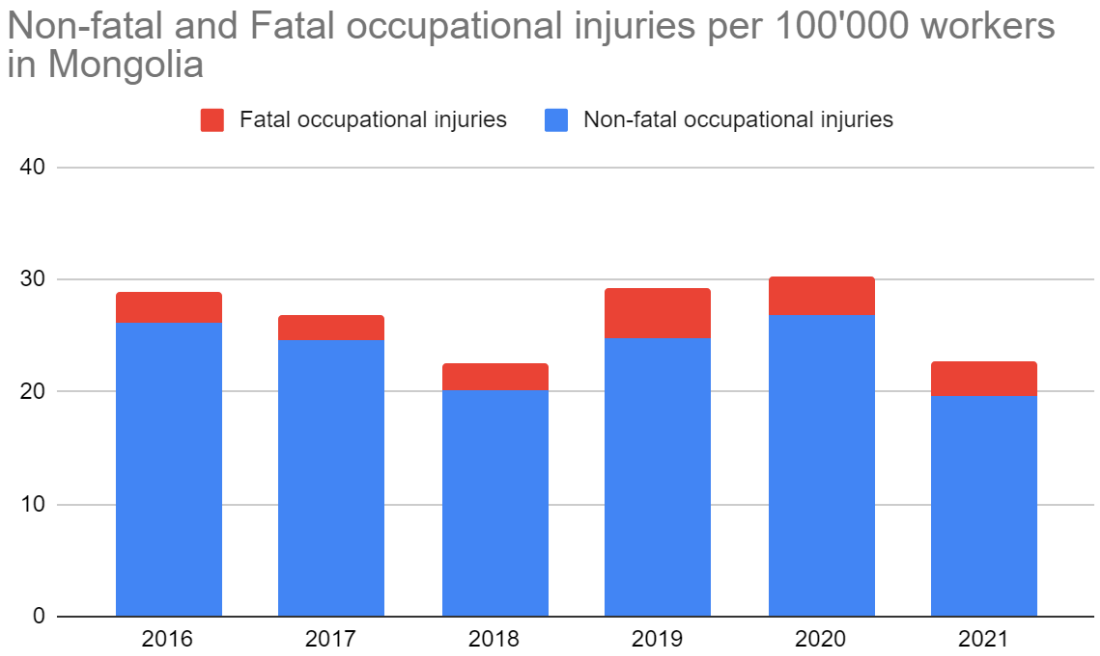

Figure 1 Injuries per 100.000 workers in Mongolia

By identifying and addressing the root causes of incidents, employers can help reduce the risk of injuries, illnesses, and property damage in the workplace. It is possible to prevent accidents, protect employees, improve workplace safety, minimize expenses, and ensure regulatory compliance by identifying potential incidents in the workplace. Employers may provide a safe and healthy work environment, reduce expenses and legal risks, and demonstrate their commitment to their employees' well-being by detecting hazards and taking immediate action to prevent mishaps.

2.2.2.Common nonconformities/ Causes

ISO 45001:2018 defines nonconformity as “not meeting the stated, implied, or obligatory requirements of standards, rules, or laws”.(10) In other words a deviation from a requirement, standard, or expectation is referred to as nonconformance. It can happen in any system, process, or product, including those concerned with quality, safety, environmental management, or any other aspect of business operations.

Nonconformance in occupational health and safety refers to any situation that fails to conform to established health and safety standards or requirements. This can include anything that could endanger the health and safety of employees, visitors, or other stakeholders in the workplace.

ISO 45001 discovered the ten most common Occupational Health and Safety (OH&S) non-conformances.

- Lack of documented processes
- Regular reviews of OH&S processes
- Define the OH&S Policy
- Set Health & Safety objectives and targets
- Communicate Health & Safety measures
- Implement a Compliance Register
- Conduct management reviews
- Utilize incident handling to improve Health & Safety
- Emergency preparedness and response
- Prepare Risk Assessments

Although the definitions of incident and nonconformity differ, their corrective action and inspection sometimes overlap. There is a distinction between them.

A person tripping over an electric cable on the floor, with or without injury; silicosis or asbestosis; noise-induced hearing loss; a broken arm; and property damage, all of which could lead to OHS risks, are examples of incidents.

Internal or external OHS audit report nonconformities; not following the organization's OHS policies and procedures; noncompliance with legal requirements; and failing PPE are examples of nonconformities.

Returning to the ISO standard's terms and definitions clause (Clause 3), it appears that an incident is related to the involvement of a person/worker, whether or not this interaction resulted in an injury or ill-health (near miss or hit). A nonconformity is defined as "a stated, generally implied, or obligatory need or expectation," which is typically stated in documented information. To distinguish between the two, they are defined an incident as the involvement of people, whereas a nonconformance is a deviation from a system or documented requirement. (11)

2.2.3. Workplace risk assessment

A risk assessment is a detailed analysis of hazard identification, hazard characterization, exposure assessment, and risk characterization. By observing and anticipating the potential hazards, it is possible to avoid or minimize the harm that might result in any workplace. The risk assessment of the workplace must be completed without delay whenever there is a change in the working environment's methods, materials, or procedures, and it must constantly be updated to reflect the factory's new work practices.

In workspace risk assessment, a process of identifying an acceptable risk level in each work space within the permanent and changing external and internal factors.

A risk assessment should identify the hazard and the necessary control measures, while an inspection should confirm their implementation. Risk assessments may benefit from workplace inspections, but we must understand the difference. Five phases are recommended for workplace risk assessment.

i. Identify the hazards
ii. Identify who might be harmed and how
iii. Evaluate the risk – identify and decide on the safety and health risk control measures
iv. Record who is responsible for implementing which risk control measures and the timeframe
v. Record the findings, monitor and review the risk assessment and update when necessary. (12)

Figure 2 Five phases of risk assessment

There are various tools, including risk matrix, decision tree, failure modes and effects analysis (FMEA), and bowtie model, and methods applied in risk assessment, for example two variable risk matrix that are aligned in both the software application and the hard copy application. It is a likelihood assessment of the hazard consequences and the assessment result returns the level of risk associated with the hazard.

		Consequence				
Likelihood		Insignificant	Minor	Moderate	Major	Severe
	Almost certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	Extreme	Extreme
	Possible	Low	Medium	Medium	High	Extreme
	Unlikely	Low	Low	Medium	High	High

	Rare	Low	Low	Low	Medium	High

Table 1 Risk level identification

Likelihood
Almost certain- will occur in most circumstances when the activity is undertaken (greater than 90% chance of occurring
Likely- will probably occur in most circumstances when the activity is undertaken (51 to 90% chance of occurring)
Possible- might occur when the activity is undertaken (21 to 50% chance of occurring)
Unlikely- could happen at some time when the activity is undertaken (1 to 20% chance of occurring)
Rare- may happen only in exceptional circumstances when the activity is undertaken (less than 1% chance of occurring)

Table 2 Likelihood

Consequences
Insignificant- first aid treatment, minor injury, no time off work
Minor- single occurrence of medical treatment, minor injury, no time off work
Moderate- multiple medical treatments, non-permanent injury, less than 10 days off
Major- Extensive injuries requiring medical treatment, serious or permanent injury/ illness, greater than 10 days off from work
Severe- severe injury/ illness requiring life support, actual or potential fatality, greater than 250 days off work

Table 3 Consequences

Risk rating priority for action			
	Risk acceptance	Action	Recommended action time frame
Extreme	Not acceptable	Cease or isolate source pf risk Implement further risk controls Monitor, review and document controls	Immediate Up to 1 month Ongoing
High	Generally (in most circumstances) not acceptable	Implement risk controls if reasonably practicable Monitor, review and document controls	1 to 3 months ongoing
Medium	Generally (in most circumstances) acceptable	Implement risk controls if reasonably practicable Monitor, review and document controls	3 to 6 months Ongoing
Low	Acceptable	Monitor and review	Ongoing

Table 4 Risk rating priority for action

2.2.4.Economic burden in terms of occupational illness and accident

Occupational illnesses and accidents can result in significant economic costs for both individuals and society as a whole. These costs can include medical expenses, lost wages, and decreased productivity. In addition, workplace injuries and illnesses can lead to increased workers' compensation claims and insurance premiums, as well as decreased morale and increased turnover rates. Therefore, it is important for employers to prioritize workplace safety and take steps to prevent occupational illnesses and accidents from occurring.

According to the ILO, around 2.78 million work-related deaths occur each year, with an additional 374 million non-fatal work-related injuries and illnesses. (13) These numbers represent a significant economic burden for employers and society, as they result in decreased productivity and increased healthcare costs.

The economic burden of occupational illness can be calculated using the following formula:

Economic burden = Direct costs (medical expenses, workers' compensation, etc.) + Indirect costs (reduced productivity, absenteeism, etc.) + Intangible costs (pain and suffering, decreased quality of life, etc.) (14)

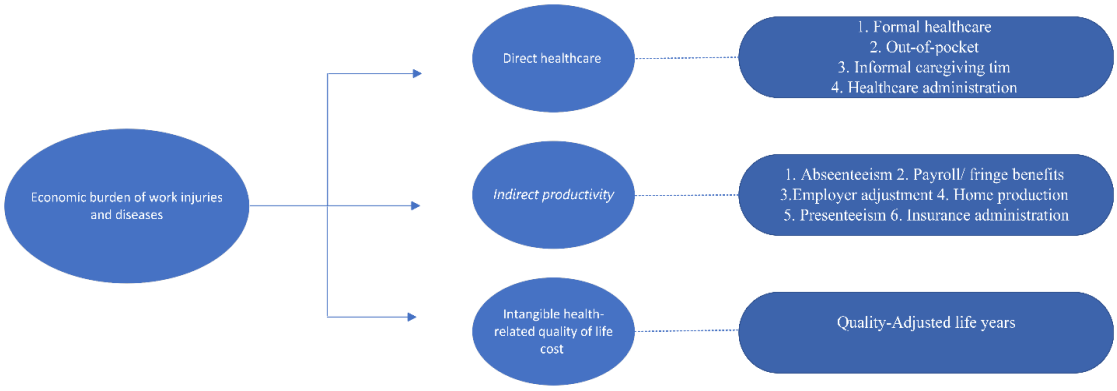

Figure 3 Economic burden classification

Calculating the economic burden of occupational illness is important for understanding the true cost of workplace safety and health issues and for making informed decisions about prevention and intervention strategies.

Occupational illnesses can have significant economic consequences for both workers and employers. The cost of these illnesses includes not only the direct medical expenses incurred but also indirect costs such as reduced productivity, absenteeism, and the intangible costs of pain and suffering or decreased quality of life. To fully understand the true cost of occupational illness, it is important to calculate the economic burden using a comprehensive formula that considers all these factors. (14)

Medical expenses, workers' compensation, and other healthcare-related costs are common direct costs of occupational disease. These expenses can be significant especially for long-term illnesses

that require continuing treatment or care. In contrast, indirect expenses are frequently more difficult to calculate but can have a major impact on the overall burden of occupational illness. These costs may include lost productivity or capacity due to missed work, as well as the costs of training replacement personnel or paying overtime to substitute for absent staff.

In addition to direct and indirect costs, the intangible costs of occupational disease must be considered. These costs may include pain and suffering, a lower quality of life, and other non-monetary variables that might have an impact on the well-being of affected workers and their families. While indirect costs are more difficult to quantify than direct costs, they are an important aspect to consider when evaluating the entire economic burden of occupational sickness. (15)

$$\sum_{t=0}^{T} \frac{1}{(1+r)^t} * (1+\beta)^t * W - \sum_{t=0}^{T} \frac{1}{(1+r)^t} * (1+\gamma)^t * W * \delta$$

Equation 1 Economic burden to employee

Where:

• r	Discount rate
• β	Salary increase
• γ	Pension increase
• W	Average salary per year
• t	Period of work ability loss
• б	Work ability

$$\boldsymbol{Cost\ for\ organization = benefit + cost\ of\ training + fine + other\ costs}$$

Equation 2 Economic burden to organization

Where:

• Benefit	In connection with the temporary or long-term loss of the ability of an employee to work
• Cost of training	Costs related to acquisition and training of new employees
• Fine	Penalty for failure to ensure the safety of labor
• Other costs	1. The compensation to be paid to the employee and his/her family who have lost their ability to work. 2. In case of premature death of an employee due to an industrial accident, costs related to the closing contract and compensation from the employer; 3. Administrative and legal expenses; 4. In case of the death of the employee, the costs incurred due to the suspension of the organization's activities and the costs related to the closing agreement and the contract;

Understanding the economic burden of occupational disease is critical for creating effective prevention and intervention methods that can reduce the occurrence and impact of workplace health and safety issues. Employers and governments may make informed decisions about how to best protect workers and promote a safe and healthy work environment by taking a holistic approach that considers the direct, indirect, and intangible costs of occupational sickness.

2.3. Management in OHS

2.3.1.History

OHSMS has appeared in many forms. In 1996, the British Standards Institute developed the BS 8800:1996-Guide to occupational health and safety management (16). And then the ISO 18001 standard was then proposed to the ISO General Assembly in 1997 to disseminate this system. However, the proposal was rejected at the General Assembly. Since then, 13 certification and consulting organizations in Europe have agreed to create temporary OHSMS standards (17). Occupational Health and Safety Assessment Series (OHSAS) 18001 was developed in 1999. Over the two decades since its development, OHSAS18001 continued to gain its popularity, being used in approximately 90,000 certifications in 127 countries (18) In 2013, ISO agreed that it was necessary to develop an OHSMS International Standard. In 2018, ISO45001 was published as an international standard, replacing several OHSMS (17).

ISO45001 as an International Standard is a guide and strategic tool to help companies overcome some of the most demanding challenges of modern business in terms of OHS. ISO certification is one of the international standards in a management system for measuring organizational quality. This ISO certification has indeed become an international standard that is widely used in 168 national standard bodies in the world because it plays an important role in measuring how credible companies want to compete globally (26). Ensuring that business operations are as efficient as possible, increasing productivity and helping companies access new markets

2.3.2.Management in OHS/ ISO 45001

Annex SL applies to all management system standards, such as full ISO standards, Publicly Available Specifications (PAS) and Technical Specifications (TS). The revised ISO 9001 and ISO14001, as well as the new ISO 45001 will all be based on Annex SL's high-level structure:

Clause 1: Scope	Clause 6: Planning
Clause 2: Normative and references	Clause 7: Support

Clause 3: Terms and definitions	Clause 8: Operation
Clause 4: Context of the organization	Clause 9: Performance evaluation
Clause 5: Leadership	Clause 10: Improvement

Table 5 General clauses of ISO implementation

Organizations are expected to adopt and certify OHS management systems faster under ISO 45001. The new standard aligns and integrates management systems with Annex SL. The standard requires companies to continuously improve OHS performance across the Deming Cycle, beginning with leadership and commitment, then planning (context analysis, risk assessment, operational planning, and control), support (communication and participation, competence and awareness of resources, and documentation management), and finally full compliance control, a large reduction in injury indexes, lower costs, and a better business image.

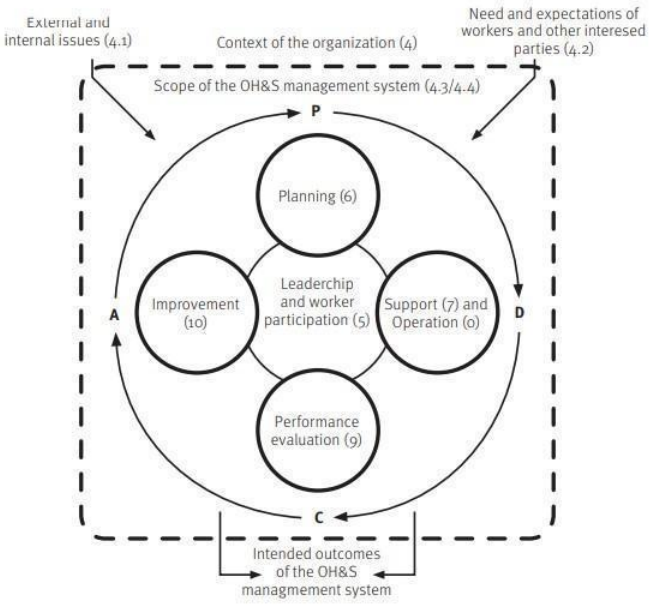

Figure 4 PDCA cycle in ISO 45001

ISO 45001 applies to all organizations, regardless of size, type, or nature. The organization's management process should incorporate all requirements. Through its OHS management system, ISO 45001 allows an organization to integrate other health and safety aspects, raise awareness, evaluate performance, and take corrective actions. Ensure workers actively implement OHS, improve their ability to comply with rules and regulations, reduce accident costs, downtime, operating costs, insurance costs, absenteeism, and employee turnover.

Main traits ISO 45001

- It follows OHSAS 18001 and HSG65's risk-based "Plan-Do-Check-Act" model.

- "...to prevent death, work-related injury, and ill health to workers, to improve and provide a safe and healthy workplace for [an organization's] workers and other persons under its control," it states.
- ISO 45001 employs the same "high-level structure" (common clauses, words, and definitions, core text, and discipline-specific modifications) as all new management system standards to help integrate (Annex SL) (19).

2.3.3.Roles of corporate management in the Implementation of ISO 45001

The successful implementation of an ISO standard necessitates commitment and involvement of all levels of administration, including corporate management. The effective implementation of ISO standards in an organization is contingent upon the crucial role took by corporate management. This includes the provision of resources, the establishment of policies and procedures, the promotion of a culture that prioritizes quality and safety, and the continual monitoring and evaluation of the management system's effectiveness.

The OHSMS is highly dependent on the support of top-level management. In the absence of such support, the successful adoption of OHSMS becomes a challenging task. Effective safety management involves more than just imposition of regulations and protocols. The promotion of safety has an impact on both individual and organizational behavior, and serves to establish a set of values that strengthen safety-related actions. The initiation of an implementation project can be facilitated by the early demonstration of commitment from top management through effective communication of the mandate, provision of sufficient resources, and allocation of a budget.

The effective integration of the Occupational Health and Safety (OHS) management system requirements into an organization's business processes is crucial. This involves the provision of adequate resources for the system, effective communication of the importance of OHS management, and the direction and support of individuals to contribute to the system's effectiveness. Additionally, relevant management roles must demonstrate leadership in their areas of responsibility to ensure the success of the OHS management system.

Regarding above, 2022 Richard Keen (20)

2.4. Implementation process of ISO 45001

2.4.1.Implementation stages of ISO 45001 in the factory

The effective execution of ISO 45001 is required for the successful achievement of intended outcomes. Each stage is closely related to clauses and follows the guidelines stated in the ISO 45001 manual. The procedure begins with an administrative decision and progresses to the

placement of organizational procedural measures. Every step plays a specific and significant role in the final stage, and they are all interconnected and complementary.

It can be challenging to implement and become certified for an OHSmanagement system, and the extensive list of requirements in the ISO 45001 standard may quickly become overwhelming. The 11 steps that follow provide a list of crucial queries to pose regarding crucial components of your system in an effort to make this easier to comprehend.

Steps for Implementation

1. Get the support of management: How will you obtain critical management support: individually or in a group meeting?
2. Understand legal obligations: Certain industries are subject to health and safety regulations that are specific to the field they operate in, such as the mining sector or manufacturing. Section 6.1.3 of ISO 45001 outlines the requirements for understanding and maintaining compliance in order for implementation to succeed.
3. Define the scope of your OH&S management system: This will be essential when developing OHS Policy, as well as the objectives and plans that will guide your OHS management system.
4. Establish processes and procedures: How can company manage OHS risks? How to identify all your hazards and risks to implement the right controls? What risk assessment is needed? What emergency response and operational controls are needed? With training and awareness, what will you record and control?
5. Put the OHS processes and procedures into action: What steps must you take to implement all of the processes and procedures outlined in Step 4? What kind of control and procedure hierarchy do you require? How to distribute the new responsibilities that some employees will be given?
6. Train and educate employees: How will you educate your employees on what ISO 45001 is and why you are implementing it? It is critical that everyone understands their role within the OH&S Management system structure.
7. Select certification body: In order to reap the greatest benefits, the company must select a certification body that is appropriate for your company. How does the certification body believe that they will benefit?
8. Maintain records and use the OH&S management system: OH&S records need corrective action and employees need more training to ensure they are mature enough to be audited.
9. Conduct internal audits and Conduct a management review: Internal audits are used to check processes and ensure records are sufficient. Management reviews are conducted to ensure the OH&S management system is working according to the senior management

plan and is well-implemented and efficient. Improvements are being made and resources are allocated.

10. Corrective actions: OH&S management systems need to be addressed through process measurements, internal audits, and management reviews. Integrate OH&S incident investigation into corrective action system to address root cause of problem.
11. Certification audits: The certification body will compare the OH&S management system plans, processes, and procedures to the ISO 45001 requirements. If any gaps are discovered, they must be corrected and evidenced. After a few days, the audit team will issue a report detailing their findings and any corrective actions. When satisfied, they will make a recommendation for certification. (21)

2.4.2.Requirements for Certification/ Mandatory documents and records for certification

The inclusion of required documentation and records is a fundamental component of achieving ISO 45001 certification. The tables of mandatory documents and mandatory records are given below in tables Table 6 Mandatory documents for ISO 45001 certification Table 7 Mandatory records for ISO 45001 certification. The ISO 45001 standard is a globally recognized framework for managing OHSMS. It mandates that organizations establish and maintain specific documentation and records to demonstrate adherence to the standard. Those documents and records serve as a substantiation of an entity's commitment to the preservation of occupational health and safety, in addition to its adherence to the rules and regulations outlined in the ISO 45001 standard. The absence of relevant documents and records could affect an organization's ability to exhibit adherence to the established standard, thereby risking its certification.

The implementation of well-defined policies and procedures related to occupational health and safety can effectively mitigate the likelihood of workplace accidents and injuries, enhance employee morale and productivity, and improve the organization's image as a secure and conscientious employer. The adoption of compulsory documents and records can aid organizations in recognizing opportunities for enhancement and in making well-informed judgments concerning resource allocation and risk mitigation. (22)

Clauses	Mandatory documents
Clause 4.3	Scope of the OH&S management system
Clause 5.2	OH&S policy
Clause 5.3	Responsibilities and authorities within OH&SMS
Clause 6.1.1	OH&S process for addressing risks and opportunities

Clause 6.1.2.2	Methodology and criteria for assessment of OH&S risks
Clause 6.2.2	OH&S objectives and plans for achieving them
Clause 8.2	Emergency preparedness and response process

Table 6 Mandatory documents for ISO 45001 certification

Clauses	Mandatory records	Clauses	Mandatory records
Clause 6.1.1	OH&S risks and opportunities and actions for addressing them	Clause 9.1.2	Compliance evaluation results
Clause 6.1.3	Legal and other requirements	Clause 9.2.2	Internal audit program
Clause 7.2	Evidence of competence	Clause 9.2.2	Internal audit report
Clause 7.4.1	Evidence of communications	Clause 9.3	Results of management review
Clause 8.2	Plans for responding to potential emergency situations	Clause 10.2	Nature of incidents or nonconformities and any subsequent action taken
Clause 9.1.1	Results on monitoring measurements analysis and performance evaluation	Clause 10.2	Results of any action and corrective action including their effectiveness
Clause 9.1.1	Maintenance calibration or verification of monitoring equipment	Clause 10.3	Evidence of the results of continual improvement

Table 7 Mandatory records for ISO 45001 certification

2.4.3.Benefits of ISO 45001

The positive influence of ISO certification on companies, both affecting sales and other aspects, there are still many pros and cons. But in the business world, those who have ISO certification will have more chances to win market competition, this certification shows the quality assurance of the products or services offered, as well as consumer confidence in related brands. Based on OSS Certification, ISO certification has several benefits for companies as a standard reference that is increasing company credibility and customer trust, guaranteeing quality with international standards, saving costs to anticipate deteriorating performance, optimizing employee performance, and improving the company's image. These benefits are expected to increase and affect sales. (23)

Applying ISO 45001 and effectively managing occupational health and safety risks can assist an organization to:

1. minimize occupational health and safety risk (including risk to mental and physical health) to all those working on its behalf
2. improve its occupational health and safety performance continually
3. integrate occupational health and safety into its business management system and processes

In addition to the humanitarian benefits of reduced injury, illness and death, good occupational health and safety management can help organizations to:

4. ensure socially responsible and sustainable operations
5. enhance productivity and customer loyalty
6. improve reputation, reliability and business success
7. attract clients and investment
8. facilitate recruitment and retention of employees
9. ensure legal compliance as a minimum
10. reduce losses due to incidents and absence
11. reduce downtime and disruption to operations
12. reduce the cost of insurance premiums (19)

2.4.4.Implementation and administrative cost

SO 45001 implementation and administrative costs vary by organization size, complexity, and health and safety management systems. These factors can affect ISO 45001 implementation and administration costs:

- Initial gap analysis: Organizations must conduct a gap analysis to determine where their occupational health and safety management system falls short of ISO 45001 requirements. This analysis's cost depends on the organization's size, complexity, and assessment resources.
- Staff training: Organizations must train staff on ISO 45001 requirements and how to implement and maintain the occupational health and safety management system. The cost depends on the number of employees and the training needed for management and staff.
- System development and implementation: Organizations must create an ISO 45001-compliant occupational health and safety management system. System development, software implementation, and maintenance can be costly.
- Certification audit: ISO 45001 compliance requires an external audit. This audit's cost depends on the organization's size, complexity, and certification body.

To comply with ISO 45001, organizations must monitor and maintain their occupational health and safety management system. Internal audits, training, and system maintenance can add up.

ISO 45001 implementation and administration costs depend on many factors. However, many organizations find that the benefits of implementing an effective occupational health and safety

management system—reduced accidents, improved employee morale, and better regulatory compliance—outweigh the costs of ISO 45001 implementation.

It is essential to consider the expenses associated with the implementation of an ISO 45001 management framework, procurement of relevant standards, participation in educational programs, and engagement of consultants and auditors. The total cost of a small organization may range from $10,000 to $15,000, whereas a larger organization may incur substantially higher expenses (24). It is important that an effectively implemented ISO 45001 management system has the potential to result in long-term cost savings for your organization.

2.5. OHS and OHSMS in Mongolia

2.5.1.General

The total amount of persons suffering from occupational diseases and industrial accidents is increasing year after year. Particularly in the mining and heavy industries sectors.

As of April 1st, 2018, 3336 people who lost working ability owing to Occupational Disease are being treated on a regular basis. Males account for 78.4% of this group. 53.7% of all patients who lost their working ability had lung dusty diseases, and those who had this sickness had worked in abnormal environments for 15- 20 years. Occupational diseases affect around 4,9 persons out of every 1000 people. (30)

Patients who have lost their working ability have returned to their prior workplace due to the low monthly allowance, and their illness has become more serious, and deaths have occurred. The patient who has lost his or her ability to work has returned to his or her previous workplace, aggravating his or her sickness.

The Law on OHSs was passed in 2008, but its implementation was poor until recently.

In Mongolia, 947 occurrences of industrial accidents and acute poisoning occurred between 2016 and 2018.(29)

Current Mongolian Legislation on Occupational Safety and Health

- Constitution
- Labour law – Labor condition, ordinary and toxic
- Law on pensions, benefits and payments from the social insurance fund in the case of industrial accidents and occupational disease
- Law on Occupational Safety and Health /since 2008/
- Law on Social Insurance
- According to the law amendment on Occupational Safety and Health, the structure

and framework has been defined as follows in 2008.

- Law on Standardization, Technical Regulation and Accreditation, and other related laws to regulate OSH
- Law on health
- Law on pensions and benefits provided by the Social Insurance Fund
- Law on Investigation of Regulatory Infringement,

ISO 45001 certification in Mongolia

Many Mongolian enterprises use ISO 45001 to manage their OHSMS. According to the Moncertf, by 2023 first quarter, around 200 Mongolian organizations will have implemented any kind of ISO standard. (27) The primary reasons for implementing it are to improve workplace safety, safeguard employees' health, prevent accidents and injuries, and comply with legal requirements. As of 2021, it has been reported by the Mongolian Agency for Standardization and Metrology (MASM) that more than 20 organizations in Mongolia have successfully implemented ISO 45001. (28)

3. Chapter 3

3.1. The study area

This study involved a comprehensive investigation of the area sub-context, focusing on the definition and scope of OHS in the context of construction manufacturing factory. The research data, held over a year, were acquired through a combination of practical internship, qualitative research from internet sources, and questionnaire administration to high-level management engineers currently working in the industry.

3.2. Data sources and collection procedure

The study commenced with an in-depth review of the existing literature on OHS, encompassing relevant definitions and concepts pertaining to workplace safety and health. The scope of OHS was specifically tailored to the context of a cement and window manufacturing factory, taking into consideration the unique hazards and risks associated with these industries.

To gather primary data, a practical internship of one year was undertaken, providing first hand exposure to the OHS practices and procedures in the factory. Qualitative research from internet sources, including scholarly articles, reports, and industry guidelines, was also conducted to supplement the data acquired through the internship.

Furthermore, I have developed a questionnaire and administered to high-level management engineers who possess extensive experience and expertise in the field of OHS within the cement and window manufacturing industry. The questionnaire aimed to gather valuable insights and perspectives on OHS practices, challenges, and opportunities in the factory setting.

The combination of practical internship, qualitative research from internet sources, and questionnaire administration to high-level management engineers enabled a comprehensive and well-rounded exploration of the area sub-context, providing robust and relevant data for the analysis and findings of this study.

3.3. Research design

The research design of this study involved a thorough investigation of the context of OHS, including its definition and scope within a cement and window manufacturing factory. The objective of the thesis was to identify strategies to eliminate costs while maintaining production levels through the improvement of OHS practices at MAK.

The scope of OHS was specifically tailored to the unique hazards and risks associated with the cement and window manufacturing industry. This involved a comprehensive review of existing

literature, industry guidelines, and relevant regulations to establish a clear understanding of OHS principles and practices in this specific context.

The research design of this study allowed for a comprehensive and robust exploration of the OHS context at MAK, combining practical internship, qualitative research from internet sources, and questionnaire administration to high-level management engineers. The findings from this study are expected to contribute to the identification of effective strategies for improving OHS practices, eliminating costs, and maintaining production levels in the cement and window manufacturing industry.

3.4. Data and data analysis

The data collection and data analysis process in this study involved multiple sources of information, including surveys conducted among unit engineering lead, HSE engineer, and quality engineer at MAK EuroBLock and MAK EuroCement. In addition, practical internship field trips were conducted at MAK EuroBLock and MAK EuroCement to gather firsthand data. The study also utilized existing documents such as HSE rules and policies, OHS policies, and HSE regulations at the factory, annual procurement planning of company raw files including OHS expenses, OHS Risk management plan and regulations, OHS KPI regulation and evaluation, and OHS expenses generated by factory operational management and compared to local research agencies' report and international use cases. These data sources were analyzed using appropriate statistical and qualitative analysis methods to draw meaningful conclusions and insights related to the OHS factor analysis and probability to control selected types of incidents.

4. Chapter 4

   Introduction: MAK LLC

Mongolyn ALT MAK company started its operation in 1993 in the mining industry with national investment. Since its inception, it has continued to develop and is currently successfully operating in the fields of mining, construction material production, travel agency, real estate, and civil aviation.

Figure 5 MAK LLC logo

Mission

We are committed to play a key role in sustainable growth and prosperity of Mongolia by engaging our core business with the geological exploration and mineral processing to a final product as well as other effective sectors of the economy.

Value

We value our qualified and amiable team which expands our operations and increases business effectiveness with most promising technology and production process.

We value our trusted partners who support our activity and advice with precious ideas driving us to a successful future. We value our environment and community and operate with the least negative impact and comply with safety at all levels of operations.

4.1. Current status of OHS measures

4.1.1.OHS in corporate organizational structure

The organizational structure of the company effectively incorporates OHS measures, demonstrating a strong commitment to protecting employee health and safety. To successfully handle OHS risks, the organization has implemented thorough policies and procedures.

The OHS inspection office in the parent organization is directly accountable for contributing general guidelines, based on the Labour Law of Mongolia and other laws and standards to subsidiaries and arranging internal audits to assure OHS issues and overseeing the performance. While the OHS inspection office provides general guidelines, the factory fabricates internal policies and procedures for its own production process and features.

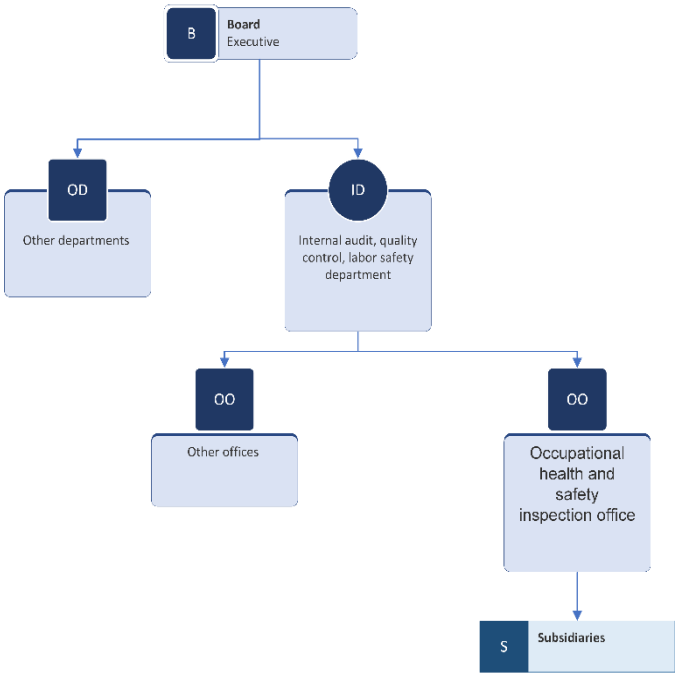

Figure 6 Organization structure in terms of OHS

To ensure adherence to OHS regulations, regular audits and inspections are performed for resolving issues.

The business organizational structure, with its thorough policies, committed staff, and proactive procedures in place to ensure the health and safety of its employees, shows a high commitment to OHS overall.

On the other hand, Subsidiaries' internal OHS procedures and policies conform to regulatory requirements. Processes for identifying hazards and evaluating risks are regularly carried out, and suitable control measures are put in place to minimize recognized risks. Workers receive thorough training on OHS regulations, such as safe work practices, emergency response methods, and how to use personal protection equipment.

A systematic strategy to control OHS risks is provided by ISO 45001:2018, which aids organizations in defining OHS's corporate structure-wide roles and responsibilities. As part of the creation and implementation of OHS policies and procedures, the standard mandates the identification and participation of pertinent stakeholders, including employees. This encourages

a culture of responsibility and accountability for OHS at all organizational levels, from top management to frontline staff.

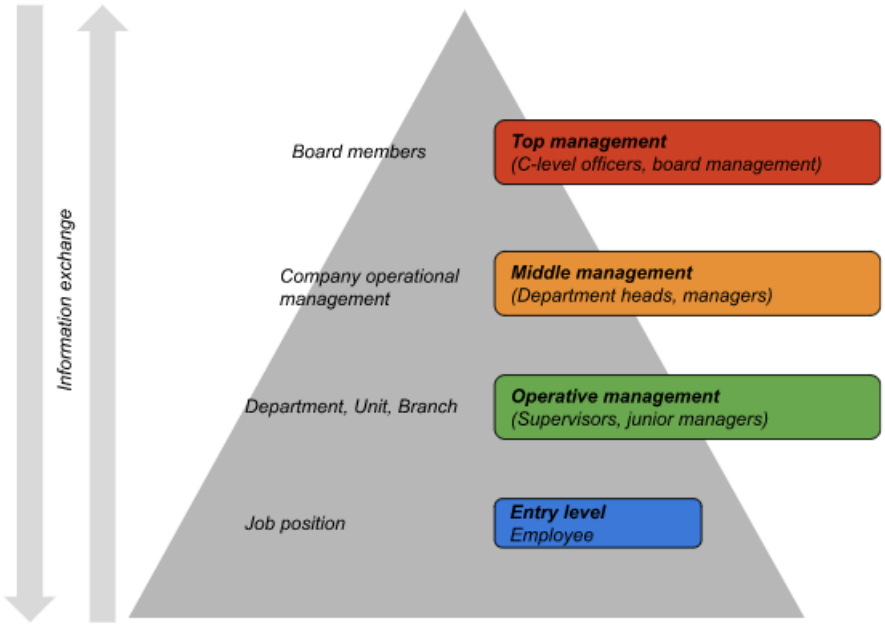

Figure 7 Information exchange flow diagram of organization

4.1.2. Industry specific OHS issues and common nonconformance

ISO 45001, a widely recognized Occupational Health and Safety (OHS) standard, ensures that factory procedures and policies are developed systematically following legal requirements and industry-specific standards. By following ISO 45001, manufacturers can proactively identify and address OHS issues to prevent nonconformance. Nonconformance can be classified into different categories based on their orientation, which may be technology-dependent or industry-dependent. Nonconformance is associated with industry specifications and can be systematic or unsystematic. Here are some common OHS nonconformance in manufacturing by observation and their corresponding reactive actions and proactive plans to prevent nonconformance:

1. Failure to wear PPE: workers must properly wear PPE while handling hazardous substances or working in hazardous environments. Although the factory regularly supplies PPE, there often needs to be more compliance among Mongolian workers. A proactive plan to address this issue should be developed and implemented, focusing on this; we will discuss it in more detail in the next part.
2. Ergonomics: Nonconformance related to ergonomics can arise when workers exceed the weight lifting limitations provided by factory instructions, potentially leading to musculoskeletal disorders (MSDs). It usually happens in the half-automatic factory during the transition between sections. However, factories equipped with complete or

half-automatic machines typically provide training on safe lifting techniques to operators, mitigating this nonconformance to some extent.

3. Noise disturbance: The impact of noise disturbance in the factory is an unmanageable variable, much like temperature and humidity in the air. Specific equipment in the factory has high noise levels contingent upon the characteristics of the technological operations being performed.
4. Dusty environment: Some parts of the factory take action related to cutting wood and other materials such as plastic and iron. Also, crushing the raw material and mixing them produces a dusty environment.

4.1.3.Responsibilities of employers and employees defined in the Handout

Employers must follow the laws, rules, and regulations bout safety and cleanliness in the workplace, provide the right tools and equipment, and look at the overall atmosphere of the workplace. The provided handout gives a full picture of what employees and employers need to do to make sure the workplace is safe and healthy. It's important for employees to follow safety and hygiene rules, follow the laws and rules about safety and hygiene at work, and take responsibility for any problems that come up because they didn't follow safety and health rules.

	Employee responsibilities	Employer responsibilities
1	Strict adherence to labor safety, hygiene procedures, standards, regulations, and technological procedures, and to fulfill the requirements set by the employer in this regard	Provision of workplaces, workplaces that meet labor safety and hygiene requirements, labor protection and uniforms, and special tools and equipment specified in laws and regulations
2	To be responsible for any problems caused by non-fulfilment of occupational safety and health requirements	Provide the opportunity to perform duties, occupational safety and health conditions according to the job description of the employee
3	Complying with the laws, rules and regulations on labor safety and hygiene of Mongolia, the relevant standards of movement safety and hygiene, and the rules, regulations and instructions applied by the company	Implementation of laws, rules and regulations on work safety and hygiene of Mongolia, relevant standards and procedures for work safety and hygiene
4		To carry out an assessment of the working conditions of the workplace, to subject the employee to preliminary and periodic medical examinations at his own expense in accordance with the laws on occupational safety and hygiene

Table 8 Responsibilities of employee and employer

The most important details are strict adherence to labor safety, hygiene procedures, standards, regulations, and technological procedures, providing workplaces that meet labor safety and

hygiene requirements, providing the opportunity to perform duties according to job description, complying with laws, rules, and regulations, and conducting a workplace assessment.

4.1.4.OHS requirement, as a part of individual, team KPI

The concept of Key Performance Indicators (KPIs) is simple and serves as a measurement tool to assess the performance of individuals and teams in achieving their objectives or goals. As Peter Duckers simplifies it, "What gets measured gets improved." KPIs refer to a set of quantifiable measurements used to gauge a company's overall long-term performance. KPIs specifically help determine a company's strategic, financial, and operational achievements, especially compared to those of other businesses within the same sector[3].

Including OHS requirements in KPIs allows tracking whether key business objectives related to safety and health are on track, behind, ahead, or already achieved. Evaluating performance over time enables the assessing of safety and health performance within an industry or organization, revealing patterns or concentrations of incidents that need to be addressed to prevent workplace fatalities, injuries, and illnesses.

There was no OHS requirement in KPI performance prior to the establishment of ISO 45001. From the old policies, the OHS performance needs to be measured at the factory in the current situation; even within the scope of ISO 45001 implementation, there is an opportunity to start measuring and controlling labor safety. Renewed policies and procedures in connection with OHS ensure that hidden and visible indicators become conspicuous to create a gauge.

The main benefit of enacting an integrated management system is to understand the correlation between each field of influence directly and indirectly; for instance, a standardized work environment can be a reason for a production rate increase. Consequently, this process management corroborates that OHS quantifying and OHS requirement is critical to KPI evaluation.

There are two types of indicators, lagging and leading. The distinction between indicators is being reactive and proactive, respectively. The lagging indicator looks into historical data and uses trends to predict the future by registering what has happened. But ISO 45001 suggests proactive actions and tools like leading indicators and continual improvement. Leading indicators focus on and analyze the future of health and safety performance by evaluating the current environment of culture.

The sample metrics of OHS performance are advocated in the recommendation section.(25)

[3] Twin A. Key Performance Indicator (KPI): Definition, Types, and Examples [Internet]. investopedia.com. Available from: https://www.investopedia.com/terms/k/kpi.asp#:~:text=Key performance indicators (KPIs) refer,businesses within the same sector.

4.1.5.Work station design (light, ventilation, temperature, noise disturbance and etc.,)

The factories under the purview of MAK LLC have effectively addressed the issue of workstation design. In this part half automotive factory is taken as an example.

- One important aspect is industrial lighting, which should be reflected in such a way that there is a minimum of $1m^2$ of window glass per $10m^2$ of floor area. The recommended norm for workplace lighting is between 25-150 lux, as insufficient lighting can contribute to accidents and cause eye strain in workers. As depicted in the accompanying picture Figure 8, he workplace lighting has been addressed through a combination of window and artificial lighting, with regular checks and surveys conducted during the ISO implementation project.
- Noise generated during production in the factories has also been addressed through various methods, including reducing generator noise and using sound absorption and isolation devices to limit noise disturbance. The OHS manager has also implemented the use of PPE to mitigate noise from machines that cannot be eliminated.
- New employees undergo a preliminary health check-up according to the procedure approved by the authorized health organization responsible for all employees. Medical branches with doctors and nurses are established on a permanent basis to provide medical care and services to the employees.
- At the beginning of every shift, workers undergo checks for alcohol levels, blood pressure, and heart rate. If the results are unacceptable, they are prohibited from working that shift. Furthermore, all workers, including office staff and factory workers, undergo comprehensive medical examinations once in a year.
- The air microclimate, air temperature, relative humidity, air movement speed, and heat in the workplace area for production and service comply with UST-12,013-91 standards. Depending on the manufacturing process, some factories may have high temperatures and humidity, while others may have low temperatures and dry conditions, which are considered hazardous environments. Therefore, daily supplements such as sea buckthorn and mineralized water are provided to workers in order to reduce potential harm.

Figure 8 Sample hall of the factory

In conclusion, MAK LLC has taken significant measures to address workstation design in their factories, including lighting, noise reduction, and employee health checks. These efforts contribute to creating a conducive work environment that promotes employee well-being, safety, and productivity.

4.1.6.Accident and injury reporting, recognition and follow-up monitoring

Reporting, evaluating, and documenting large and small accidents, violations of safety rules, and actions that may cause accidents to the appropriate person without delay is a very important tool for early identification and elimination of major hazards that may occur in the future. Documenting these health and safety requirements not only meets legal requirements, but also provides evidence of reliable operation.

In the event of any work-related emergency, all employees shall report the process in accordance with the following guidelines:

- The worker shall report the accident to the HSE engineer. The ERP system will also keep track of the accident book that the HSE engineer specially issued. In addition, the engineer is obliged to inform the management of the company about the accident.

- The HSE engineer and the chief engineer will review the risk assessment for the workplace as a result of the internal inspection of the incident. After this inspection, the HSE Engineer and Chief Engineer will determine the preventive measures.
- The HSE Council should be informed about this, and appropriate advice should be given to the employees. In this way, it is appropriate to re-illustrate and remind other workers of the risk of accidents.
- In some important and individual cases, the HSE Council prepares an information sheet, presents it to the company's management, and submits it for approval. Finally, these sheets and forms are distributed to the departments and posted in a visible place.

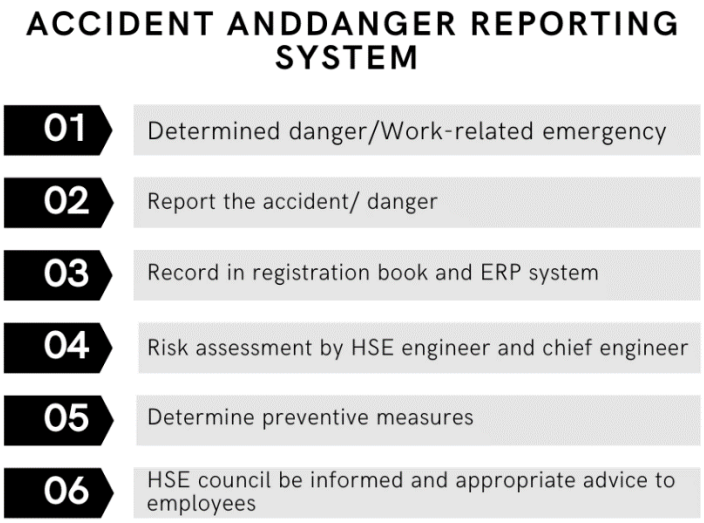

Figure 9 Accident and danger informing system

The number and impact, or risk, of accidents at the factory is almost non-existent compared to the industry average, and due to the low level of severity of injuries, there are few risk controls after proper instructions are given.

4.1.7. SWOT analysis in terms of OHS

Figure 10 SWOT analysis in terms of OHS

Strengths: As a group company, the Internal Audit, Quality Control, and Labor Safety Department oversee operations. Employees in each unit possess comprehensive knowledge of the factory's processes, allowing them to work flexibly and reduce industrial accidents. Before starting work, employees receive workplace instructions and undergo a daily medical examination. The factory provides full protective equipment to ensure employee safety. Employees with the appropriate personal attitude are expected to utilize personal protective equipment at all times as required.

Weakness: The organization needs more documentation on policies, objectives, and procedures related to occupational health and safety. There need to be more workers responsible for Health, Safety, and Environment (HSE) matters which does not comply with HSE laws. Deviating from workplace instructions increases the risk of hazards, posing a disadvantage. Medical examination conditions for employees working night shifts and weekends are unmet, potentially compromising compliance. Instances where one employee operates multiple pieces of equipment, pose safety concerns. Not all employees consistently use personal protective equipment (PPE).

Opportunities: Inflation rates decreased from 15% in July 2022 to 12.9% in December 2022, which is expected to positively impact the budget spending of the HSE department. The

concentration of trade and services in Ulaanbaatar city offers the convenience of one-stop shopping. The youthful composition of the labor force presents an advantage in accident prevention due to its ability to mobilize and reduce industrial accidents. Employees with the appropriate personal attitude should exhibit behaviors such as using protective equipment at the right time, maintaining workplace order, and identifying, reducing, and eliminating hazards. The development of equipment designed to enhance safety and reduce accidents can create opportunities for reducing industrial accidents, as decreased human intervention may result in lower health and safety costs. The existence of laws on health and safety provides an opportunity to develop and implement company-level rules that are in compliance with the law.

Threats: Procuring personal protective equipment that meets international standards may pose feasibility challenges. Increased taxes and inflation may impact the HSE budget for purchasing personal protective equipment, potentially affecting the implementation of the HSE plan. Difficulties in purchasing inventory may arise due to increased shipping costs, which could lead to traffic issues and increase the risk of industrial accidents along transportation routes. Chaotic urbanization may affect workers' psychological state and increase the risk of injuries. Workers with a lower standard of living may be at higher risk of industrial accidents due to emotional instability and distractions. Wrong lifestyle choices, such as smoking near equipment or failing to use personal protective equipment on time, may increase HSE costs. Workers' distractions, such as phone usage or listening to music, may pose risks in the workplace. Introducing new equipment may result in accidents due to a lack of skilled labor. Extreme weather conditions such as slippery roads, improper use of road safety equipment, and increased diseases may pose higher risks, leading to increased industrial accidents, including those caused by snow storms, slips, and lightning strikes.

4.2. Factor and cost analysis

4.2.1.OHS manual and ISO manual

The salient feature of ISO 45001 is establishing a comprehensive documentation process encompassing policies, procedures, job descriptions, job instructions, plans, forms, and records, among others. This approach provides opportunities for ongoing improvement within factories, with the ultimate goal of minimizing near miss accidents, and injuries and, most importantly, reducing the overall number of accidents.

Stated above, the parent organization provides broad OHS guidelines, and the factory manual is created based on its features. Despite the fact that each factory has its own handbook, it was still

overly general and some information was left out. The document has been updated with detailed information in the context of ISO 45001 implementation. MAK EuroBlock and MAK EuroCement have already been ISO 45001 certified, and the frequency of usage and its relationship to the number of injuries in the revised manual are given below:

In this section, a sample survey was conducted among the workforce of MAK LLC, with a focus on occupational safety and health engineers, quality engineers, and section supervisors. The study was designed to evaluate and compare the situation before and after the implementation of ISO, and the findings are presented in the subsequent table and graph.

This sample study examined the frequency of accidents and minor injuries before and after implementing ISO 45001. Considering the main changes, 40.7% of all survey participants believed that an accident occurs once in a fortnight. In comparison, 18.7% thought that an accident occurs once a fortnight after implementing the revised regulations. This indicates an immediate halving of existing or potential risks. In addition, 40.7% of the respondents answered that there are two accidents in a month, and 18.5% said there are no accidents. After the implementation of occupational safety management, the number of 2 accidents decreased to 7.4%, 59.3% answered that there is only once a month, and 25.9% said no accidents or injuries. The results of the 2-time cycles show the same direction, and there is a tendency for workplace accidents to decrease after the procedures and manuals become clear.

A primary inquiry of this investigation pertained to the frequency of utilization of the ISO or Integrated Management of Standards handbook. The occupational safety engineer was primarily responsible for addressing daily concerns, suggesting that the workplace's instructional and safety procedures are well-defined and internally consistent, as evidenced by the observed correlation with prior outcomes. Approximately 11% of the respondents reported that they had never utilized the product, which may suggest a potential lack of available instructional materials or published documentation.

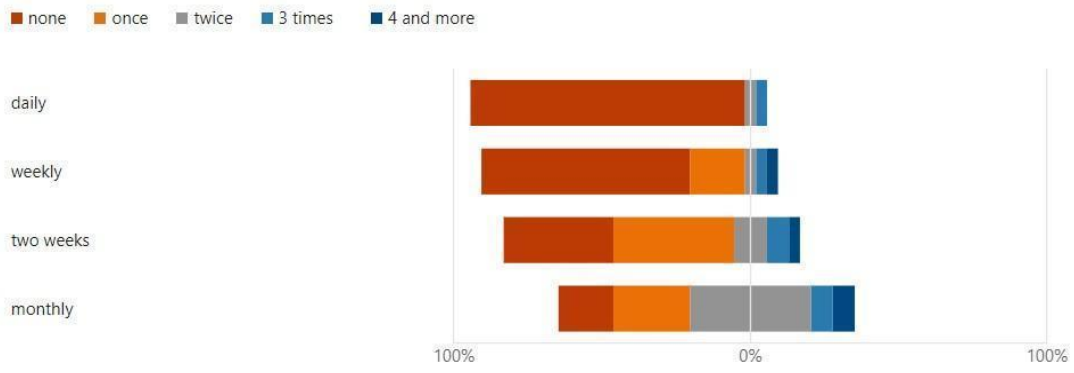

Figure 11 Frequency of incident occurrence before revised handout

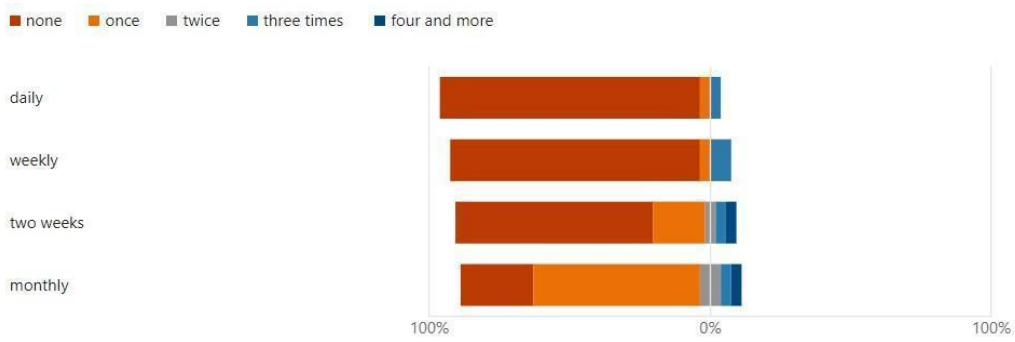

Figure 12 Frequency of incident occurrence after revised handout

4.2.2.Sample work place analysis: (work quality, personal safety and work place safety)

The results of the workplace analysis indicate whether the workplace conditions meet acceptable levels for work quality, personal safety, workplace safety, and other parameters such as ventilation, lighting, temperature, and noise.

For example, the analysis was conducted in Hall A at the factory where operators and masters have various tasks to complete at the same time in high frequency noise level. The shift last 12 hours with an hour break. There are x number of operators work at the same time and almost all of them are cause of loud noise.

The work place analysis was held on operators of steel pipe cutting mainly. Consequently, the noise generated by the circular saw spreads throughout the space, exposing the operator working on the steel pipe cutting table directly and the neighboring operators indirectly. In addition to this particular operator, other operators will contribute to the overall noise level and collectively shape the environmental conditions. Prolonged exposure to such noise levels can result in hearing loss. The study indicates that noise impacts performance and can lead to a decrease in the accuracy of work by almost 67%. As the factory has a single line to operate, the very first step of operation can determine the production rate of the day. One incident of an operator accessing with the wrong dimensions at the very first step can be correlated with noise distraction, although such incidents occur infrequently.

However, nonconformity in output and lost production can result from such incidents. Also the hazard identification and risk assessment sheet demonstrates that loud noise disturbance in hall A happens frequently and its level of consequence can be high.

Although the factory has provided personal protective equipment (PPE) such as workstation clothes, boots, goggles, a hat with a protective canopy, and hearing protection, young workers tend to listen to music during repetitive tasks, despite being instructed on proper PPE usage. Therefore, worker behavior can contribute to a reduction in personal safety performance, despite the factory's efforts.

Apart from noise disturbance, the analysis indicates that the other parameters such as temperature, moisture levels, and lighting are within acceptable levels. In the following parts mentioned other parameters are neglected in working environment evaluation and noise disturbance will be highlighted.

Figure 13 Sample Hall 1 with db

Figure 14 Sample Hall 2 with db

4.2.3. Steps taken to minimize the identified effects

After identifying the effect, action should be taken in a place where the hazardous environment or incident happened. It is a crucial step to reach objectives and improve the production rate and OHS performance at the same time. Here is the list of actions that have been taken to reach targeted objectives and is being implemented in the frame of new OHS management.

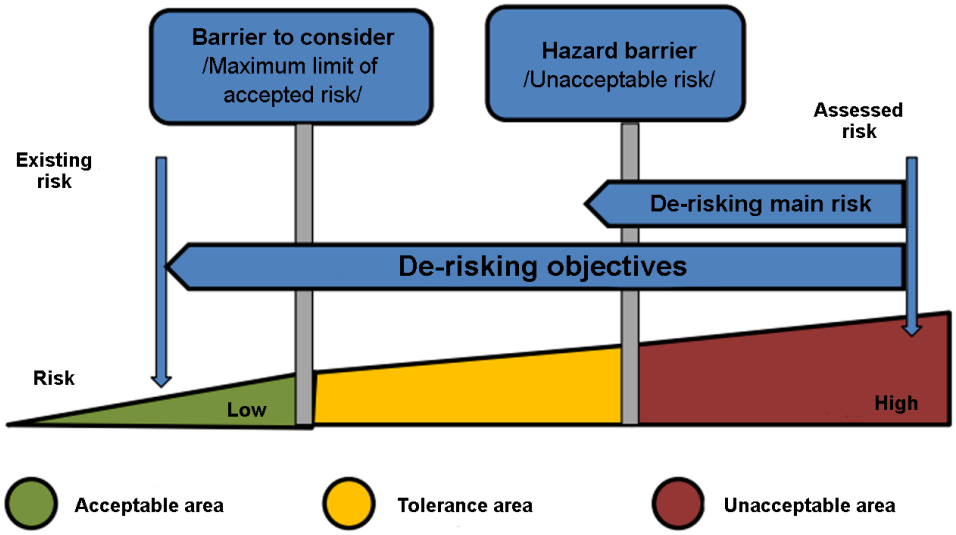

Figure 15 Damage reduction and sequence of actions

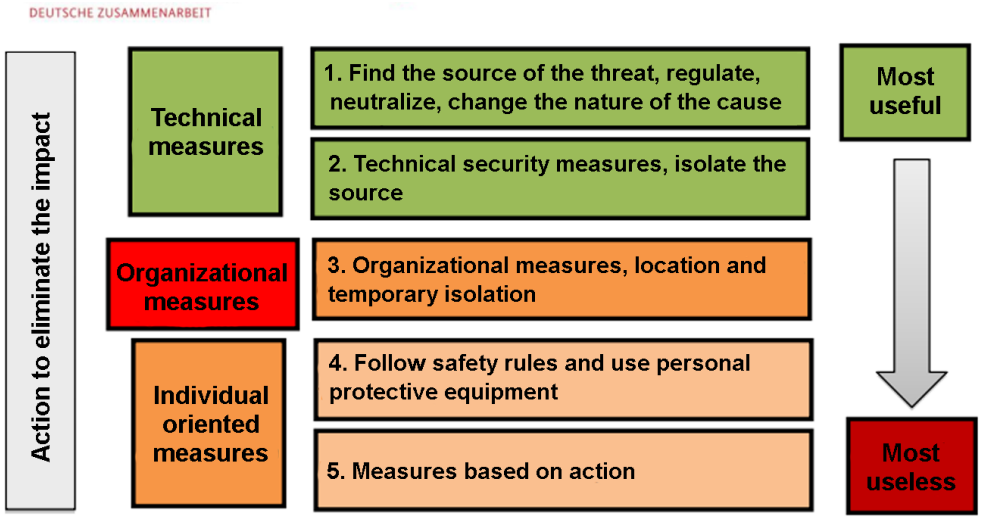

Figure 16 Impact measurement hierarchy

Safety training: Encouraging behavioral changes through safety training that effectively communicates potential hazards and implementing regular monitoring measures is a cost-effective solution to significantly improve the current situation.

5S (methodolgy): According to renewed KPI system, the factory is implementing Japanese 5S as a tool to assess their performance, and at the end of the year honorable employees will be selected and awarded incentives. It is not only for quality management, but also it is for the whole integrated management system. OHS requirements is the core concept in 5S.

Figure 17 Japanese 5s methodology

Reporting and recording system: The next newly implemented tool is to stick QR code everywhere in factory that QR code is devoted to informing the danger.

And also deploy network droppers within the factory environment to increase uptime and reduce distractions

Defined handout: Moreover, an improvement on the current situation on the handout can affect not only OHS performance, but it can also act on output quality. According to the survey conducted on the factories, the results indicate an improvement in the quality of output following the implementation of updated policies and maintenance. While a significant portion of participants (more than half) responded with "no idea," this does not necessarily imply that there has been no change. Of the respondents, 8% reported a reduction in nonconformity by 0-5%, while another 8% noted a decrease in output errors of 6-10%. Moreover, 23% of the participants reported a reduction in nonconformity of 11-15%.

4.2.4. Time frame for Monitoring, Inspection and Evaluation of safety practice

The constant monitoring, inspection, and evaluation of plant safety measures is a vital component of this system. The time range should be realistic, achievable, and based on the specific needs and hazards of the factory.

The following time frame is suggested as a guideline for conducting regular monitoring, inspection, and evaluation of factory safety practices:

- Daily inspections: Daily worksite inspections help discover and address hazards. Supervisors or designated personnel should perform these inspections. All factory

areas—workstations, equipment, and materials—should be inspected. Safety hazards can be caught early with daily inspections.

- Weekly Review: Safety records and incident reports should be reviewed weekly to detect trends and opportunities for improvement. Safety records include inspection, accident, and training reports. This data can reveal safety issues.
- Monthly Safety Audits: Monthly safety audits evaluate safety rules and procedures and suggest areas for improvement. Audits should cover the factory's safety management system more thoroughly than daily inspections. Safety management system-trained internal or external auditors can do safety audits.
- Quarterly Safety Training: Workers need safety training and refresher courses to promote a safety culture and stay informed of safety policy modifications. Workers should receive quarterly safety training to stay abreast of new regulations. Safety training should encompass emergency procedures, hazard detection, and PPE.
- Annual Comprehensive Review: Safety rules and procedures must be reviewed annually to stay current and effective. This safety management system assessment should cover safety policies, procedures, training programs, and records. Policies and procedures must be updated as regulations or best practices change.

By adhering to this timetable, plant management may ensure that safety processes are routinely monitored, inspected, and assessed in order to detect and address potential dangers and safeguard workers from work-related injuries and illnesses. Maintaining a safe and healthy work environment requires a complete safety management system that involves regular monitoring, inspection, and review.

4.2.5. Cost of administrative and management measures

In the context of OHS management and issues in factories, there exist three types of costs: direct, indirect, and intangible.

Regarding OHS training, it is important to note that such training is provided both by the parent organization and the factory individually. In light of the OHS engineer's ability to provide basic and seasonal training to new employees, no additional cost is incurred by the factory in this regard. Furthermore, the SWOT analysis reveals the opportunity to leverage the parent organization's training resources, thereby obviating the need for in-house training expenses. The only potential cost of training, in this scenario, pertains to transportation and day salaries if employees need to participate in offsite training. However, if the factory decides to halt production to allow all employees to attend training, the resulting production loss must also be considered.

Another significant investment in OHS management is related to the implementation of ISO 45001:2018. The cost of this implementation is confidential, but it includes expenses associated with adopting an ISO 45001 management system, purchasing standards, attending training sessions, and engaging consultants and auditors. These costs will vary depending on the size of the organization, with larger organizations incurring substantially higher expenses. As mentioned before in chapter 2, a small organization may spend $10,000-$15,000, whereas a larger organization may spend significantly more.

Finally, the most significant and primary cost associated with OHS management is the procurement of labor protection equipment, and other ancillary products such as safety barriers, signs etc. These equipments are essential to mitigate the risks posed by environmental hazards and ensure that the factory meets minimum safety standards. For the year 2023, the estimated cost of the such items procurement plan is approximately 270 million tugriks (267,766,500.00).

4.2.6. Monetary cost of management

The cost of implementing administrative and managerial measures in organizations is a critical factor that can significantly impact the financial performance of the company. One such cost is the hiring of new employees for OHS engineers or compliance managers. For instance, in the case of MAK EuroWindoor, there is a need to hire a new OHS engineer to inspect the increasing number of workers and job complexity may result in additional payroll expenses, leading to an increase in labor costs.

The amount of payroll will be 24.300.000 - 28.350.000 (31) tugriks for a year. This amount includes payroll taxes, 12.5%, that will be paid from the company.

Another significant expense is the purchase of safety equipment and products such as fire extinguishers, warning signs, safety barriers, and detox quality products. The extent of this expense depends on the toxicity level of the factory's environment. This purchase differs from previous purchase is purpose of use. For instance, the factory has organized its environment according to Mongolian standards, but the environment is still identified as hazardous. Therefore, the factory must neutralize the hazards using supplements such as artichoke, blueberry, sea buckthorns, and water. In 2023, the factory has planned to allocate around around 120 million tugriks to buy such products.

Insurance costs also pose a significant expense, with MAK LLC insuring every employee, though the cost may vary depending on the factory. This is considered a manufacturing overhead cost.

Implementing administrative and managerial measures comes with several costs that can have direct effects on a company's financial performance. It is essential for companies to consider these

costs and develop effective strategies to minimize expenses and ensure compliance with regulations and standards.

4.2.7. Time and monetary cost of noncompliance

This section is explained with reference to an unreal incident. However, there is no historical record of such accidents occurring, although this has been identified as a potential danger during workplace inspections. The case study was founded on a basis of imaginative speculation. This case is being evaluated within the framework of legal regulations.

The case: During the process of providing products and services to customers, an employee experienced a fall from a significant height. The employee is 30 years old and receives a monthly pay of 1,500,000 MNT. It was found that the worker had lost 70 percent of his work ability, and it was also established that the worker would be unable to work for a period of three years. These findings were based on the opinion of an expert.

Question: 1. Is occupational work occured at out of workplace considered as an occupational injury?
Question 2. If it is considered an industrial accident, please estimate the amount of damage to MAK LLC

Answer 1: According to Article 3, Section 3.1.9 of the Law on Occupational Safety and Health, "workplace" means any place under the direct or indirect control of the employer, where a citizen or employee must visit in connection with their duties. Also, according to Article 3.1.20 of the law, "industrial accident" means when an employee is exposed to industrial or similar factors while performing his/her duties." It can be seen from here that the employee fell and suffered an injury that lost 70 percent of his work capacity, which is an industrial accident.
Answer 2: In that case, it can be set at 45 percent according to "Article 5, 1 of the Law on pensions and benefits provided by the social insurance fund".
If the employee's disability pension is set at 45 percent of 1,500,000 MNT, it will be 675,000 MNT per month. Since the employee cannot work during the 3-year period of disability, he received a disability pension and received 825,000 MNT less than the salary he received from the employer. The employee is obliged to pay 825,000*36=29,700,000 MNT for the underpaid salary of the employee.
In addition, MAK LLC. is responsible for paying the employee all necessary expenses related to health damage, such as nursing care, supplemental meals, artificial limbs, and sanatorium treatment.

It is crucial to compute the production's faced losses resulting from the employee's work incapacity. Fortunately, MAK LLC industrial workers have factory insurance that covers some compensation costs. The corporation or parent organization will cover the rest.

The prospective economic burden on the organization is calculated in accordance with the law. And now, using Equation 1, the possible economic for the employee will be shown in table with same baseline data rates as previous.

Discount rate	r	15%
Salary increase	β	7%
Pension increase	γ	5%
Average salary per year	W	16,500,000.00
Period of work ability loss	T	3
Work ability loss	σ	0.7

Table 9 Baseline data rates

Year of work ability loss	Potential loss (₮)
0	4,950,000.00
1	4,806,521.74
2	4,655,557.66
3	4,499,147.37
	18,911,226.76

Table 10 Potential economic burden

4.2.8. Expected benefits of ISO

Expected benefits	MAK LLC case
Minimized occupational health and safety risk	Pass
Continual occupational health and safety performance	Pass
Integrated occupational health and safety into its business management system and processes	Pass

Ensured socially responsible and sustainable operations	Pass
Enhanced productivity and customer loyalty	Pass
Improved reputation, reliability and business success	Pass
Attracted clients and investment	Pass
Facilitated recruitment and retention of employees	Fail
Ensured legal compliance as a minimum	Pass
Reduced losses due to incidents and absence	Fail
Reduced downtime and disruption to operations	Pass
Reduced the cost of insurance premiums	Fail

Table 11 Expected benefits to MAK LLC

An integrated management system is now being implemented by MAK LLC across all of its subsidiaries. In parallel workshops for the three management systems—ISO 9001, ISO 14001, and ISO 45001—the goals of each workshop are being created through group discussions. This strategy guarantees that the MSs' goals are congruent with one another and act as pillars for the aims of the factory as well as the organization's vision and mission.

Observation has shown that short-term layoffs continue despite adequate working safety circumstances. By observation, despite the fact that the working safety conditions are sufficient at the current level, the layoff is short-term. It is seen that sustainable work is not related to job security

4.3 Analysis and findings

The rationale behind companies adopting ISO 45001 is to improve their occupational health and safety management systems. By implementing this standard, companies can identify and control hazards in the workplace, reduce the risk of accidents and injuries, and create a safe working environment for their employees. Overall, adopting ISO 45001 can help companies demonstrate their commitment to employee safety and well-being, and improve their reputation among customers, stakeholders, and the general public.

Implementing ISO 45001 is a proactive approach that companies can take to ensure that they are providing a safe and healthy work environment for their employees. This is particularly important in industries that involve high-risk activities or hazardous materials, where accidents and injuries can have serious consequences. By adopting ISO 45001, companies can establish a framework for identifying and assessing health and safety risks, implementing controls to mitigate those risks, and continuously improving their management systems.

The implementation of ISO 45001 provides several benefits to an organization. It helps to improve the occupational health and safety management systems of the organization. By adopting this standard, companies can identify and control hazards in the workplace, reduce the risk of accidents and injuries, and create a safe working environment for their employees. By doing so, companies that adopt ISO 45001 may benefit from increased productivity and reduced costs associated with workplace accidents and injuries.

The socio-economic impact of ISO 45001 is significant as well. By implementing this standard, companies can contribute to the overall well-being of society by promoting safe and healthy work environments. This can help to improve the health and safety of workers, reduce the burden on the healthcare system, and minimize the economic costs associated with workplace accidents and injuries.

Adopting ISO 45001 can be effective in reducing the probability of workplace injuries and illnesses. By implementing this standard, companies can identify and control hazards in the workplace, reduce the risk of accidents and injuries, and create a safe working environment for their employees. Moreover, the standard requires companies to establish a framework for identifying and assessing health and safety risks, implementing controls to mitigate those risks, and continuously improving their management systems. This proactive approach can help companies prevent incidents before they occur and reduce the likelihood of workplace injuries or illnesses. Overall, the implementation of ISO 45001 can contribute to a safer and healthier work environment for employees.

The reduction of workplace injuries and illnesses can have numerous benefits for organizations. For example, lower rates of absenteeism can lead to increased productivity, and higher levels of employee satisfaction can result in reduced turnover rates and improved recruitment efforts. Additionally, reducing the likelihood of workplace injuries and illnesses can have a positive impact on an organization's reputation and brand image among customers, stakeholders, and the general public.

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusion

The systematic implementation of this standard fosters established procedures for handling potential hazards and risks, leading to a substantial decrease in the probability of occurrences of incidents. The implementation of proactive OHS risk management enables organizations to prevent workplace illnesses and injuries, thereby promoting a healthier and safer environment for their workforce.

The significant impact of adequate occupational health and safety (OHS) management on the social and economic environment is significant. The mitigation of accidents and injuries results in a reduction of operational downtime, a decrease in compensation claims, and a lowering of insurance premiums, thereby generating cost savings for organizations. Furthermore, it leads to enhanced employee morale and productivity. From a wider perspective, it results in a decrease in the burden on healthcare and social welfare services, mitigates the loss of expertise and knowledge due to sickness or injury, and fosters general economic advancement.

The implementation of an (OHSMS) in an organization or factory, in accordance with the ISO 45001 guidelines, has a multifaceted impact. This extends beyond simple conformity to rules and regulations, resulting in an enhanced standing, heightened employee engagement, and increased efficiency in operation. The systematic and intentional approach towards Occupational Health and Safety (OHS) offers a well-defined structure for recognizing potential dangers, evaluating associated risks, and executing essential measures. This approach is an essential component of the organization's comprehensive management system. The act of positioning the organization as a responsible employer has the potential to enhance relationships with various stakeholders such as employees, customers, and regulators.

The proactive approach of ISO 45001 towards risk management, worker participation, and continual improvement is observed to result in enhanced OHS performance, as per the OHS and OHSMS concepts. The implementation of security standards fosters a safety-oriented culture, wherein each employee is cognizant of and actively participates in the health and safety measures that have been established.

The advantages of implementing OHS factor analysis and integrating it with ISO 45001 are significant. Effective occupational health and safety (OHS) management is a crucial factor in driving societal progress. It is not only an organizational responsibility but also contributes to

enhancing workplace safety, improving productivity, boosting morale, reducing economic costs, and alleviating societal burdens.

5.2. Recommendation

5.2.1.Employer' program

Health and Safety Practices	80 – 100% (4)	60 – 80% (3)	40 – 60% (2)	20 – 40% (1)	0 – 20% (0)
1. Formal safety audits at regular intervals are a normal part of our business.	☐	☐	☐	☐	☐
2. Everyone at this organization values ongoing safety improvement in this organization.	☐	☐	☐	☐	☐
3. This organization considers safety at least as important as production and quality in the way work is done.	☐	☐	☐	☐	☐
4. Workers and supervisors have the information they need to work safely.	☐	☐	☐	☐	☐
5. Employees are always involved in decisions affecting their health and safety.	☐	☐	☐	☐	☐
6. Those in charge of safety have the authority to make the changes they have identified as necessary.	☐	☐	☐	☐	☐
7. Those who act safely receive positive recognition.	☐	☐	☐	☐	☐
8. Everyone has the tools and/or equipment they need to complete their work safely.	☐	☐	☐	☐	☐

Figure 18 OHS requirement recommendation in KPI

During my internship at national beverage manufacturer, I encountered similar challenges. It was mandated for every employee to report at least 2-3 near-miss incidents per month, and the OHS engineer was responsible for addressing them. Those actions can enable to detection of every spot that can be a source of incidents.

The factory can adopt this as a good practice, such as conducting two management review meetings per year as per ISO 45001 Clause 9.3 requirements, or requiring the reporting of a minimum of two near-miss incidents and their solutions every month using a prepared online template, tailored to the characteristics of the specific factor.

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