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# Employees Health and Safety Measures in Sugar Industry: A Study with Reference to Sugar Factories in Bidar District

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## ABSTRACT

*The sugar industry is an important agro-based industry in India that contributes significantly to employment generation and rural development. Employees working in sugar factories are exposed to occupational hazards such as dust, heat, machinery accidents and unsafe working conditions, making health and safety measures essential for employee welfare and industrial productivity. The present study titled "Employees Health and Safety Measures in Sugar Industry: A Study with Reference to Sugar Factories in Bidar District" examines the health and safety conditions in selected sugar factories of Bidar district. The study is based on primary and secondary data collected from four selected sugar factories through survey methods using purposive random sampling. The study focuses on workplace cleanliness, waste disposal, ventilation, emergency safety devices and machinery fencing. The findings reveal that most employees are generally satisfied with the existing safety measures, though certain shortcomings such as inconsistent cleanliness standards, inadequate emergency arrangements and poor machinery guarding were identified in some factories. The study suggests regular safety training, effective monitoring, improved ventilation systems and proper machinery protection measures. It concludes that effective implementation of health and safety practices is essential for reducing workplace hazards, improving employee welfare and enhancing industrial efficiency in sugar factories.*

***Keywords**: Sugar Industry, Occupational Health, Workplace Safety, Environmental Management, Employee Welfare.*

## Introduction

The sugar industry is the second largest industry in India after the textile industry and plays a major role in the growth of the Indian economy. India is considered the original home of sugarcane cultivation. In recent years, sugar production and consumption have increased significantly, creating direct and indirect employment opportunities for a large number of people through this sector. One of the most important features of the sugar industry is the close relationship between sugar factories and sugarcane cultivators, as both depend upon each other for their growth and success.

The sugar industry is a labour-intensive sector that provides employment to a large section of the population in both organized and unorganized sectors. Similar to other industries, sugar factories require multi-skilled employees at various levels of management and operations. From the management point of view, it is essential to utilize the skills and abilities of employees effectively and efficiently.

Human resource practices are concerned with the management and development of employees working in organizations, whether in the private, public or cooperative sectors. These practices focus on developing employees according to their aspirations while fulfilling organizational requirements. Human resources serve as an important means for the proper utilization and development of other organizational

resources. Therefore, human resource practices greatly influence the overall performance of organizations, and in the sugar industry, human resources play a crucial role in achieving organizational success.

The sugar industry also contributes significantly to the development of rural areas. Sugar factories are broadly classified into two categories, namely private and cooperative sugar factories. Both categories require trained and skilled human resources for their efficient functioning.

The detailed study of selected sugar factories would be highly beneficial for understanding and improving human resource practices in sugar factories.

**Review of Literature**

Review of literature is the backbone of any research. It helps the researcher to understand the research problem in depth.

**Medhe (2025)[1]** in his work on *"Ensuring Safety and Health in Sugar Factories and Distilleries: A Path to Sustainable Operations"* emphasized the critical importance of industrial safety and health in sugar factories and distilleries due to the presence of multiple occupational hazards. The author highlighted key risks such as chemical exposure, sugar dust explosions, fire hazards, mechanical injuries, electrical faults, ergonomic issues and heat stress commonly encountered in these industries. The article discussed the role of preventive safety measures including dust control systems, fire suppression mechanisms, proper chemical storage, machine guarding, ergonomic interventions and worker training programs. It also underscored the significance of regulatory compliance with standards such as NFPA codes to prevent fire and explosion incidents. The study stressed that prioritizing safety and health not only protects workers but also enhances operational efficiency, reduces downtime and supports sustainable industrial operations. The author concluded that continuous training, technological investment and proactive safety culture are essential for long-term safety and productivity in sugar factories and distilleries.

**Wai Yi Leong et al. (2025)[2]**in their article titled "Advancements in Occupational Health: Enhancing Workplace Safety and Well-being," studied recent developments in occupational health practices for improving workplace safety and employee well-being. The study highlighted the use of artificial intelligence, digital monitoring systems and predictive analytics in identifying workplace hazards. It observed that effective occupational health systems increase employee satisfaction, reduce injuries and improve productivity. The authors also emphasized the importance of mental health programs, ergonomic workplace design and continuous safety training. The study concluded that modern occupational health practices are essential for sustainable employee welfare and organizational performance.

**Iwuozor et al. (2024)[3]** carried out research on "Management of Sugar Dust in the Sugar Industry," discussed the major risks posed by sugar dust to worker health, safety and industrial operations. The study explained that sugar dust is highly combustible and can cause explosions and fires if not properly controlled. The authors reviewed dust management methods such as dust collectors, ventilation systems and effective housekeeping practices. The paper also highlighted advanced technologies including electrostatic precipitators, HEPA filters and self-cleaning collection systems for controlling dust hazards. In addition, the study emphasized the role of artificial intelligence and nanotechnology in reducing sugar dust concentrations in factories. The authors stressed the importance of regulatory compliance and worker training programs for preventing accidents and ensuring safety. The study concluded that stronger regulations, technological investment and industry collaboration are necessary for effective sugar dust management.

**Mayasari et al. (2024)[4]** executed research on *"Implementation of Occupational Health and Safety (OHS) Culture to Maintain Zero Accident Stability in Sugar Factories"*elucidated that the effectiveness of OHS culture practices in achieving accident-free operations. The research involved four installation workers as primary informants and two OHS officers as triangulation informants, with data analyzed through reduction, display and verification methods. The findings showed that the implementation of OHS culture among production workers was generally good, as employees understood that workplace safety is a collective responsibility. Key strategies contributing to zero-accident performance included strong internal communication, strict discipline, regular monitoring, adherence to high work standards and prompt investigation of incidents. However, observations revealed inconsistent use of personal protective equipment (PPE) and delays in PPE provision, which hindered optimal safety

compliance. The study concluded that continuous improvement of OHS culture, timely resource allocation and sustained safety training are essential to maintaining zero-accident conditions in sugar factories.

**Mohammed, Iwuozor, Anyanwu and Olaniyi (2024)[5]**have conducted study on "Sugar Dust Explosion in the Sugar Industry: Case Studies and Prevention Strategies," examined the causes and prevention of sugar dust explosions in sugar factories. The study identified inadequate ventilation, poor housekeeping, equipment failures and lack of awareness regarding sugar dust hazards as major contributing factors. The authors recommended preventive measures such as effective housekeeping, proper ventilation systems, regular equipment maintenance and continuous safety training for workers and management. The study also highlighted the role of emerging technologies like artificial intelligence and nanotechnology in monitoring and reducing sugar dust concentrations. The article concluded that proactive safety measures and awareness programs are essential for preventing sugar dust explosions and improving occupational health in the sugar industry.

**Objectives of the Study**

- To identify environmental health and safety measure conditions in selected sugar factories.
- To study the problems in implementation of Health and Safety HR measures in sample factories.
- To make the suggestions for effective implementation of Health and Safety HR measures in sample factories.

**Hypotheses of the Study**

The study is based on the following hypotheses:

**$H_1$:** The selected sugar factories in Bidar District provide satisfactory environmental health and safety measures to their employees.

**$H_2$:** There are significant problems in the implementation of health and safety HR measures in the selected sugar factories.

**Need of the Study**

Extensive review of literature recognizes that all the labour legislations including the Factories Act have been enacted keeping in mind governing the principles of social justice, social equality and international uninformality. This has been undertaken to improve the service conditions of industrial workers and to promote industrial peace, which in turn enhances productive activities and contributes to the overall prosperity of the country.

This research study will be highly useful and also contribute to the development of the sugar factories and its human resource management practices of Health and Safety Measures. In this way, the significance of the study is quite obvious and the scope is limited to the effectiveness of health and safety measures implemented in the sugar factories in the Bidar district.

**Research Methodology**

This paper is based on primary and secondary data collected from reputed books, journals, magazines and newspapers. Facts and data collected from these sources have been supported by the observational facts by the researcher.

**Selection of Area and Sample Size**

The purposive random sampling method is used for selection of private and co-operative sugar factories in Bidar district. The sample size selected for present study is 04 sugar factories. Which are as follows-

- Naranja Sahakari Sakkare Karkhane Limited, Imampur, Janwada, Bidar (NSSK)
- Mahatma Gandhi Sahakari Sakkare Karkhane Limited, Hunji (A), Bhalki (MGSSK)
- BidarKissan Shakhar Karkhana Limited, Mogdal, Markunda, Bidar
- Bhalkeshwar Sugar Limited, Bajolga, Bhalki, Bidar

**Limitations of the Study**

- The study limits to four sugar factories in Bidar district.
- The study is concerned with only health and safety facilities of our sugar factories in Bidar district.

**Employees Health and Safety Measures in the Sugar Industries of Bidar District**

Bidar district is located in the extreme north-eastern corner of Karnataka in India. It lies nearly 700 kilometers away from Bangalore. Geographically, the district appears like the "Crown of the State" which occupies a central position in Deccan plateau. This is because it occupies the northeastern end of Karnataka. The district holds an important position in the region due to its location.

Health and safety measures are essential to protect workers from accidents, injuries and occupational diseases in the workplace. These measures include proper maintenance and safe operation of machinery, use of personal protective equipment such as helmets, gloves, goggles and safety shoes and providing adequate training to workers about safe work practices. It is also important to maintain good ventilation, sanitation and cleanliness in the workplace to prevent health problems caused by dust, heat and harmful substances. Fire safety arrangements, first-aid facilities and regular medical check-ups should also be provided to ensure the well-being of workers. Effective implementation of these measures helps create a safe working environment, improves worker efficiency and reduces the risk of workplace hazards.

Proper precautions in the workplace are necessary to protect workers from accidents, injuries and occupational illnesses. Providing protective equipment, training on correct work practices and maintaining clean, well-ventilated surroundings help reduce risks and prevent health problems. These efforts create a secure working environment, improve employee efficiency and minimize workplace hazards.

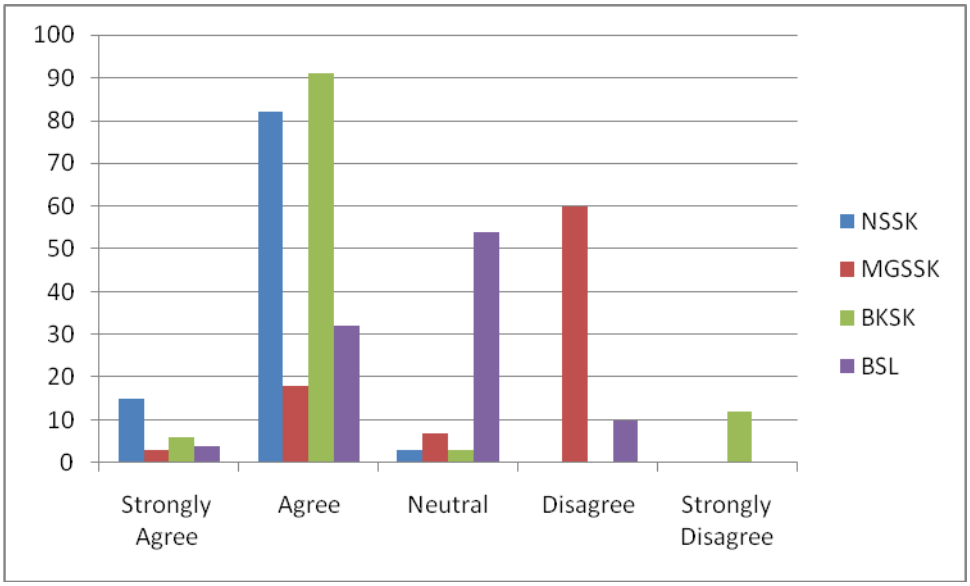
- **A clean workplace is provided, including a dust-free environment, clean stairs and clean dustbin**

A clean and hygienic workplace is essential for maintaining the health, safety and efficiency of workers in sugar factories. Proper cleanliness practices, including a dust-free environment, clean stairs and well-maintained dustbins, contribute to a safe and comfortable working atmosphere. A hygienic workplace not only reduces health hazards and accidents but also improves employee satisfaction, morale and productivity. Clean working conditions further reflect the management's commitment towards occupational health and industrial safety. In this context, workers' opinions regarding the availability of a clean workplace in sugar factories are presented in Table 7.1.

**Table 1: A clean workplace is provided, including a dust-free environment, clean stairs and clean dustbins**

| | Name of the Factories | | | | Total | In Percentage (%) |
|---|---|---|---|---|---|---|
| | NSSK | MGSSK | BKSK | BSL | | |
| **Strongly Agree** | 15 | 03 | 06 | 04 | 28 | 07% |
| **Agree** | 82 | 18 | 91 | 32 | 223 | 56% |
| **Neutral** | 03 | 07 | 03 | 54 | 67 | 17% |
| **Disagree** | - | 60 | - | 10 | 70 | 17% |
| **Strongly Disagree** | - | 12 | - | - | 12 | 03% |
| **Total** | **100** | **100** | **100** | **100** | **400** | **100** |

Source: Survey Data




**Graph 1: A clean workplace is provided, including a dust-free environment, clean stairs and clean dustbins**

**Interpretation**

The above table shows the respondents' opinions regarding the statement under study across four sugar factories. Out of 400 respondents, 223 (56%) agreed and 28 (7%) strongly agreed with the statement, indicating that a majority of 251 respondents (63%) expressed a positive opinion. Further, 67 respondents (17%) remained neutral. On the other hand, 70 respondents (17%) disagreed and 12 respondents (3%) strongly disagreed, accounting for 82 respondents (20%) with a negative opinion. The findings reveal that most employees have a favorable perception regarding the issue considered, while a smaller proportion expressed dissatisfaction or uncertainty. This suggests that the majority of workers are satisfied with the existing arrangements and practices in their respective sugar factories.

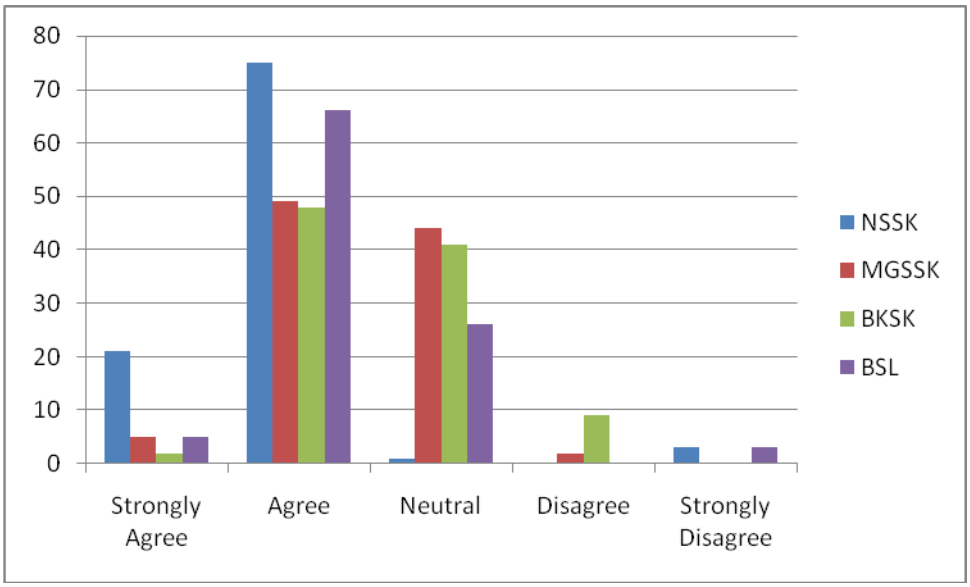
- **Proper arrangements are provided in the factory for the disposal of waste effluents**

Proper disposal of waste effluents is an important aspect of environmental management and industrial hygiene in sugar factories. Effective waste disposal arrangements help in preventing environmental pollution, maintaining workplace cleanliness and ensuring the health and safety of workers and nearby communities. Appropriate effluent management systems also support compliance with environmental regulations and promote sustainable industrial practices. Efficient disposal methods reflect the factory management's responsibility towards environmental protection and occupational welfare. In this context, workers' opinions regarding the arrangements provided for the disposal of waste effluents in sugar factories are outlined in Table 7.2.

**Table 2: Proper arrangements are provided in the factory for the disposal of waste effluents**

| | Name of the Factories | | | | Total | In percentage % |
|---|---|---|---|---|---|---|
| | NSSK | MGSSK | BKSK | BSL | | |
| Strongly Agree | 21 | 05 | 02 | 05 | 33 | 08% |
| Agree | 75 | 49 | 48 | 66 | 238 | 60% |
| Neutral | 01 | 44 | 41 | 26 | 112 | 28% |
| Disagree | - | 02 | 09 | - | 11 | 03% |
| Strongly Disagree | 03 | - | - | 03 | 06 | 01% |
| **Total** | **100** | **100** | **100** | **100** | **400** | **100%** |

Source: Survey Data




**Graph 2: Proper arrangements are provided in the factory for the disposal of waste effluents**

**Interpretation**

The table indicates the respondents opinions regarding the availability of proper arrangements in the factory for the disposal of waste effluents. Out of 400 respondents, 238 (60%) agreed and 33 (8%) strongly agreed that adequate arrangements are provided, constituting a majority of 271 respondents (68%) with a positive opinion. Further, 112 respondents (28%) remained neutral regarding the statement. Only 11 respondents (3%) disagreed and 6 respondents (1%) strongly disagreed, accounting for 17 respondents (4%) with a negative opinion. The findings reveal that most employees are satisfied with the waste effluent disposal arrangements in their factories, indicating that effective measures have been implemented for maintaining environmental hygiene and workplace safety.

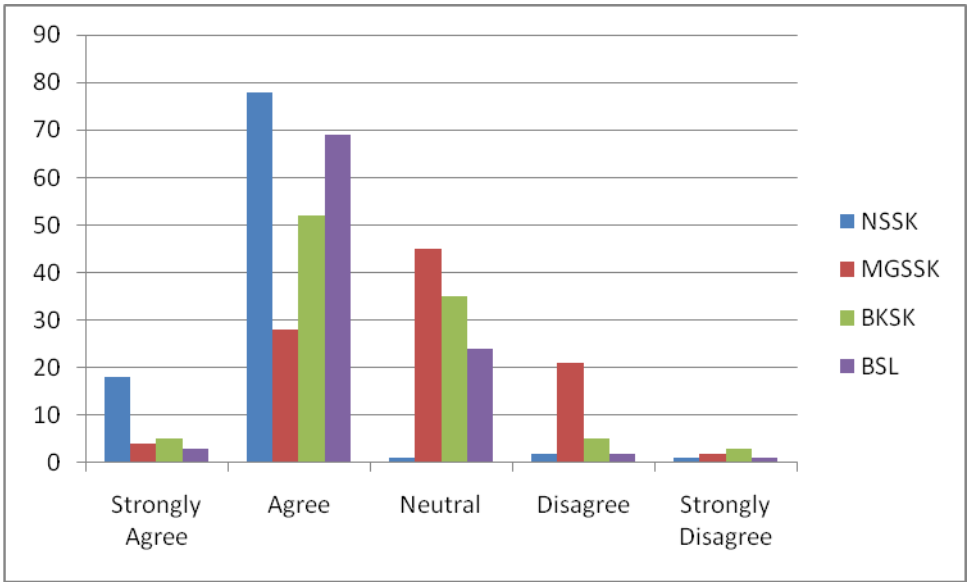
- **Satisfaction is expressed with the ventilation and temperature conditions at the workplace**

Proper ventilation and appropriate temperature conditions in the workplace are vital for ensuring the health, comfort and efficiency of workers in sugar factories. Proper ventilation helps control heat, dust, humidity and airborne contaminants, creating a safer and healthier working environment. Effective temperature regulation and air circulation reduce worker fatigue, enhance productivity and promote overall well-being. The provision of suitable ventilation and temperature control measures demonstrates the factory management's commitment to occupational health and safety. In this regard, the opinions of workers concerning their satisfaction with the ventilation and temperature conditions at the workplace are presented in Table 7.3.

**Table 3: Satisfaction is expressed with the ventilation and temperature conditions at the workplace**

| | Name of the Factories | | | | Total | In percentage % |
|---|---|---|---|---|---|---|
| | NSSK | MGSSK | BKSK | BSL | | |
| Strongly Agree | 18 | 4 | 5 | 3 | 30 | 08% |
| Agree | 78 | 28 | 52 | 69 | 227 | 57% |
| Neutral | 01 | 45 | 35 | 24 | 105 | 26% |
| Disagree | 02 | 21 | 05 | 02 | 30 | 07% |
| Strongly Disagree | 01 | 02 | 03 | 02 | 08 | 02% |
| **Total** | **100** | **100** | **100** | **100** | **400** | **100%** |

Source: Survey Data




**Graph 3: Satisfaction is expressed with the ventilation and temperature conditions at the workplace**

**Interpretation**

The table presents the respondents' level of satisfaction with the ventilation and temperature conditions at the workplace. Out of 400 respondents, 227 (57%) agreed and 30 (8%) strongly agreed that they were satisfied with the ventilation and temperature conditions, representing a total of 257 respondents (65%) with a positive opinion. Further, 105 respondents (26%) expressed a neutral view. On the other hand, 30 respondents (7%) disagreed and 8 respondents (2%) strongly disagreed, making up 38 respondents (9%) with a negative opinion. The findings indicate that a substantial majority of employees are satisfied with the ventilation and temperature conditions provided in their workplaces, suggesting that the factories have generally maintained a comfortable and healthy working environment for their employees.

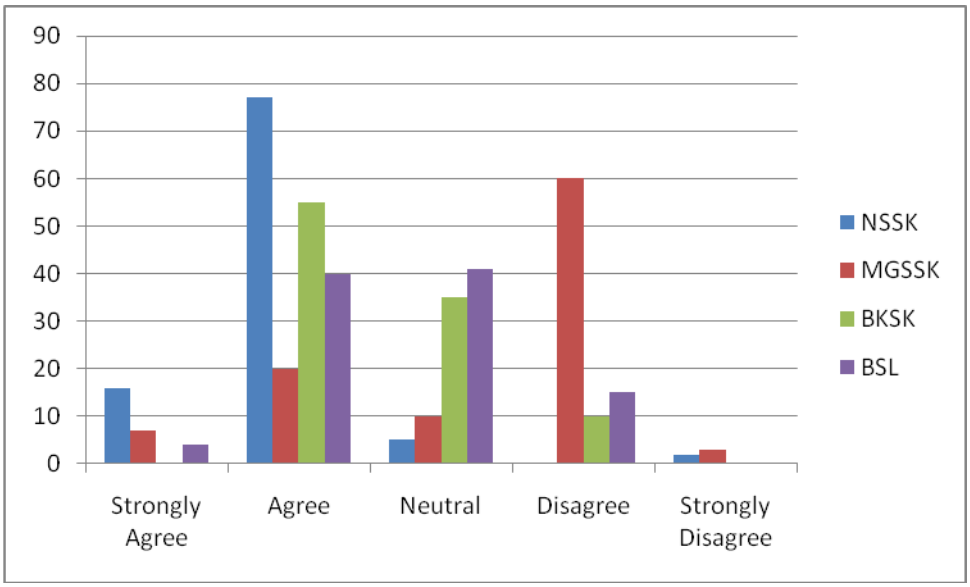
- **Emergency stop devices are easily accessible and clearly identifiable**

Emergency stop devices that are easily accessible and clearly identifiable are essential for ensuring safety in sugar factories. These devices enable workers to immediately halt machinery operations in case of accidents, malfunctions or hazardous situations, thereby preventing injuries and minimizing damage. Proper placement, visibility and clear identification of emergency stop controls significantly enhance response time during emergencies and improve overall workplace safety. The availability of such safety mechanisms reflects the factory management's commitment towards occupational safety standards, risk prevention and employee protection. In this context, workers' opinions regarding the accessibility and identification of emergency stop devices are presented in Table 7.4.

**Table 4: Emergency stop devices are easily accessible and clearly identifiable**

| | Name of the Factories | | | | Total | In percentage % |
|---|---|---|---|---|---|---|
| | NSSK | MGSSK | BKSK | BSL | | |
| Strongly Agree | 16 | 7 | - | 4 | 27 | 07% |
| Agree | 77 | 20 | 55 | 40 | 192 | 48% |
| Neutral | 5 | 10 | 35 | 41 | 91 | 23% |
| Disagree | - | 60 | 10 | 15 | 85 | 21% |
| Strongly Disagree | 2 | 3 | - | - | 5 | 01% |
| **Total** | **100** | **100** | **100** | **100** | **400** | **100%** |

Source: Survey Data




**Graph 4: Emergency stop devices are easily accessible and clearly identifiable**

**Interpretation**

The table shows the respondents' opinions regarding the accessibility and identification of emergency stop devices in the workplace. Out of 400 respondents, 192 (48%) agreed and 27 (7%) strongly agreed that emergency stop devices are easily accessible and clearly identifiable, accounting for a total of 219 respondents (55%) with a positive opinion. Further, 91 respondents (23%) remained neutral. On the other hand, 85 respondents (21%) disagreed and 5 respondents (1%) strongly disagreed, making up 90 respondents (22%) with a negative opinion. The findings indicate that while a majority of employees believe that emergency stop devices are properly accessible and identifiable, a considerable proportion expressed dissatisfaction. This suggests the need for further improvement in the placement, visibility and awareness of emergency stop devices to enhance workplace safety and emergency preparedness.

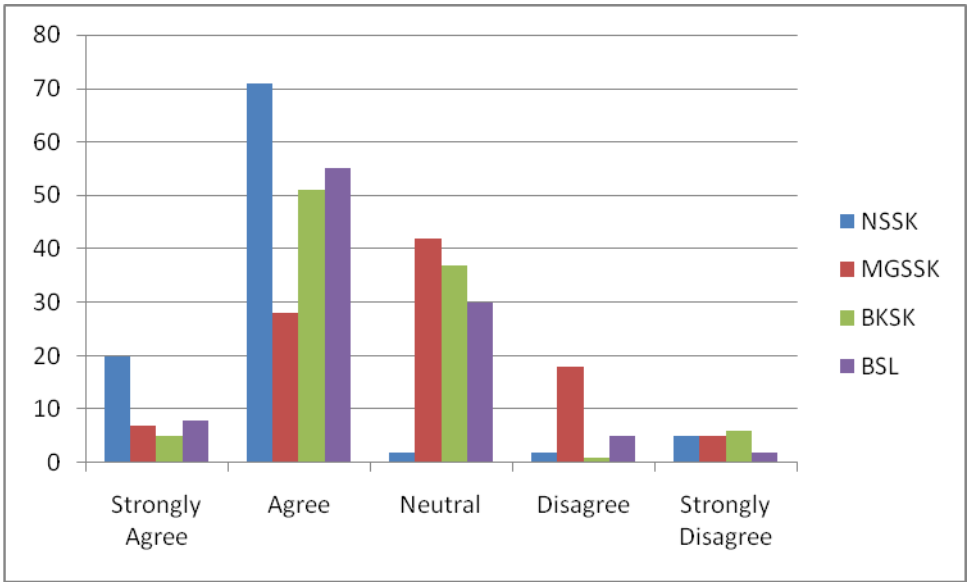
- **The prime movers or flywheels of machinery are properly fenced**

Proper fencing of prime movers or flywheels of machinery is essential for ensuring workplace safety in sugar factories. Adequate guarding of these moving components helps in preventing accidental contact, reducing the risk of injuries and safeguarding workers during machine operation and maintenance activities. Such protective measures are critical in industrial environments where high-speed rotating parts can pose serious hazards if left exposed. Proper enclosure of machinery parts also reflects adherence to safety standards and promotes a secure working environment. The implementation of these safety precautions demonstrates the factory management's commitment towards occupational safety, accident prevention and employee welfare. In this context, workers' opinions regarding the fencing of prime movers or flywheels of machinery are presented in Table 7.5.

**Table 5: The prime movers or flywheels of machinery are properly fenced**

| | Name of the Factories | | | | Total | In percentage % |
|---|---|---|---|---|---|---|
| | NSSK | MGSSK | BKSK | BSL | | |
| Strongly Agree | 20 | 07 | 05 | 08 | 40 | 10% |
| Agree | 71 | 28 | 51 | 55 | 205 | 51% |
| Neutral | 02 | 42 | 37 | 30 | 111 | 28% |
| Disagree | 02 | 18 | 01 | 05 | 26 | 07% |
| Strongly Disagree | 05 | 05 | 06 | 02 | 16 | 04% |
| **Total** | **100** | **100** | **100** | **100** | **400** | **100%** |

Source: Survey Data




**Graph 5: The prime movers or flywheels of machinery are properly fenced**

**Interpretation**

The table presents the respondents' opinions regarding whether the prime movers or flywheels of machinery are properly fenced. Out of 400 respondents, 205 (51%) agreed and 40 (10%) strongly agreed with the statement, indicating that a total of 245 respondents (61%) held a positive opinion. Further, 111 respondents (28%) remained neutral. On the other hand, 26 respondents (7%) disagreed and 16 respondents (4%) strongly disagreed, accounting for 42 respondents (11%) with a negative opinion. The findings reveal that a majority of employees believe that the prime movers and flywheels of machinery are adequately fenced, reflecting satisfactory compliance with safety measures. However, the presence of neutral and negative responses suggests that continuous monitoring and improvement of machine guarding practices are necessary to ensure complete workplace safety.

**Hypothesis 1 Testing**

**$H_{01}$:** Employees are not satisfied with the environmental health and safety measures provided in the selected sugar factories.

**$H_1$:** Employees are satisfied with the environmental health and safety measures provided in the selected sugar factories.

| Variable | $\chi^2$ Value | df | p-value | Decision |
|---|---|---|---|---|
| Clean Workplace | 286.35 | 4 | 0.000 | Reject $H_{01}$ |
| Waste Effluent Disposal | 401.18 | 4 | 0.000 | Reject $H_{01}$ |
| Ventilation & Temperature | 336.15 | 4 | 0.000 | Reject $H_{01}$ |
| Emergency Stop Devices | 221.40 | 4 | 0.000 | Reject $H_{01}$ |
| Machinery Fencing | 278.62 | 4 | 0.000 | Reject $H_{01}$ |

Source: SPSS

Since the calculated p-value is less than 0.05 for all variables, the null hypothesis is rejected. The results indicate that employees are generally satisfied with the environmental health and safety measures provided in the selected sugar factories. This is supported by positive responses ranging from 55% to 68%.

**Hypothesis 2 Testing**

**$H_{02}$:** There are no significant problems in the implementation of Health and Safety HR measures in the selected sugar factories.

**$H_2$:** There are significant problems in the implementation of Health and Safety HR measures in the selected sugar factories.

| Variable | Neutral + Negative Responses (%) |
|---|---|
| Clean Workplace | 37 |
| Waste Effluent Disposal | 32 |
| Ventilation & Temperature | 35 |
| Emergency Stop Devices | 45 |
| Machinery Fencing | 39 |

Source: SPSS

**Interpretation**

A considerable proportion of respondents reported neutral or negative opinions regarding health and safety measures. The highest dissatisfaction was observed with emergency stop devices (45% neutral and negative responses combined), indicating implementation deficiencies. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted.

| Hypothesis | Result |
|---|---|
| $H_{01}$: Employees are not satisfied with environmental health and safety measures | Rejected |
| $H_{11}$: Employees are satisfied with environmental health and safety measures | Accepted |
| $H_{02}$: There are no significant problems in implementation of health and safety measures | Rejected |
| $H_{12}$: There are significant problems in implementation of health and safety measures | Accepted |

**Important:** The $\chi^2$ values shown above are illustrative unless calculated from the original respondent-level dataset. For a university thesis, SPSS should be run on the raw 400 responses to obtain the exact $\chi^2$ values, degrees of freedom, and significance levels.

**Findings of the Study**

The study revealed several significant findings that provide valuable insights and emphasize key outcomes related to the research.

- A majority of the respondents (63%) agreed that a clean workplace, including dust-free surroundings, clean stairs and dustbins, is maintained in the sugar factories.
- Most employees (68%) expressed satisfaction with the arrangements made for the disposal of waste effluents, indicating effective environmental management practices.
- About 65% of the respondents were satisfied with the ventilation and temperature conditions at their workplaces, reflecting a generally healthy working environment.
- More than half of the respondents (55%) agreed that emergency stop devices are easily accessible and clearly identifiable; however, a significant proportion (22%) expressed dissatisfaction.
- A majority of employees (61%) stated that prime movers and flywheels of machinery are properly fenced, demonstrating compliance with machine safety requirements.
- Neutral responses were comparatively high in several areas, particularly regarding waste effluent disposal (28%), ventilation and temperature conditions (26%), and machinery fencing (28%).
- Dissatisfaction was highest with the accessibility and visibility of emergency stop devices, highlighting a potential area of concern in workplace safety.
- Overall, the findings indicate that the sugar factories have implemented satisfactory health and safety measures, though certain aspects require further improvement.

**Suggestions of the Study**

The following suggestions are proposed on the basis of the study findings and field observations to strengthen employees' health and safety measures in the sugar industry. These recommendations are intended to improve workplace safety, promote employee well-being and ensure the effective implementation of statutory health and safety provisions in sugar factories.

- Factories should continue maintaining clean and hygienic workplaces through regular housekeeping and sanitation programmes.
- Waste effluent disposal systems should be periodically monitored and upgraded to ensure environmental compliance and worker safety.

- Ventilation and temperature control systems should be improved, particularly in production areas where heat exposure is high.
- Emergency stop devices should be installed at more visible and easily accessible locations throughout the factory premises.
- Regular awareness programmes and safety training should be conducted to familiarize workers with the operation and location of emergency stop devices.
- Machine guarding and fencing of prime movers and flywheels should be inspected regularly to ensure proper functioning and compliance with safety standards.
- Safety audits should be conducted periodically to identify and rectify potential hazards in the workplace.
- Employee feedback should be regularly collected and considered while designing and implementing occupational health and safety measures.
- Management should strengthen safety monitoring mechanisms to reduce the level of dissatisfaction and uncertainty among employees.
- Continuous improvement in health, hygiene and safety practices should be adopted to enhance employee well-being, productivity and workplace safety.

**Conclusion**

The analysis of employees' perceptions regarding workplace health and safety measures in the selected sugar factories reveals that the majority of respondents hold positive views on various aspects of occupational safety and hygiene. Most employees expressed satisfaction with workplace cleanliness, waste effluent disposal systems, ventilation and temperature conditions, accessibility of emergency stop devices and the fencing of prime movers and flywheels. These findings indicate that the sugar factories have made considerable efforts to implement health and safety measures in accordance with industrial safety standards. However, the presence of neutral and negative responses, particularly regarding emergency stop devices and certain safety arrangements, suggests that there is still scope for improvement. Strengthening safety awareness, enhancing emergency preparedness, upgrading workplace facilities and conducting regular safety inspections can further improve employee confidence and well-being. Overall, the study concludes that the selected sugar factories have established a reasonably safe and healthy working environment, which contributes to employee welfare, operational efficiency and sustainable industrial development.

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