

Noise Risk Assessment for Spooling Process in Manufacturing Industry

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Abstract

This research undertakes a comprehensive assessment of noise risks within the spooling area of an industrial facility, with a specific focus on the recently installed spooling machine. The primary goal is to conduct a quantitative measurement and analysis of noise levels in the operational phase of the new machine, utilizing a noise level meter for precise readings. The second objective involves a comparative analysis, comparing noise data from the new spooling machine with historical data from the current machine. This comparative approach seeks to identify notable variations, offering insights into potential improvements for noise reduction strategies. The ultimate aim of the study is to propose practical engineering controls for minimizing noise levels, potentially recommending the integration of noise-absorbing machinery or an upgrade to the existing spooling machine. By addressing these objectives, the research seeks to contribute to a safer and more conducive working environment in the spooling area, emphasizing the importance of effective noise management strategies in industrial settings and highlighting the role of engineering controls in mitigating potential risks associated with elevated noise levels.

1. Introduction

Noise is an unpleasant sound that results from changes in pressure in the air and is frequently a byproduct of industrial activities like vibration or turbulence. As a result of these pressure changes, waves arising from the turbulent or source that vibrates. High noise levels can damage your hearing and have other negative impacts on your health. Occupational Safety and Health Administration (OSHA) specifies protection beginning at 85 dB since the severity of the harm mostly depends on the level of noise and the length of exposure. Hear ringing or humming in your ears when you leave work, need to shout to be heard by a coworker and have experience temporary hearing loss when leaving work was among of the situations that has the potential to cause cumulative noise-induced hearing loss, which may be either temporary or permanent. Short-term loud exposures cause temporary hearing loss, which returns to normal after some downtime. In most cases, exposure to loud noise for an extended period of time progressively results in permanent damage.

1.1 Research Background

RYCO HYDRAULICS SDN. BHD., located in Kuala Ketil, Kedah, Malaysia, specializes in manufacturing hydraulics and spiral hoses. Established on October 1, 2002, the company conducted a NRA, as required by the Department of Occupational Safety and Health (DOSH) under the Noise Exposure Regulations. The assessment was carried out by Mr. Lee Jia Yi, a certified noise risk assessor, on May 10th, 11th, and 12th, 2022, with assistance from Cik Mak Wan, a representative of the company.

The assessment focused on the spooling process, identified as having high decibel readings in past observations. A previous assessment in 2022 had highlighted noise issues, leading to the installation of a new spooling machine. The recent assessment confirmed that the suggested engineering control measures for the exposure group were implemented, aligning with the NRAR/19-12/019 report. The company proactively addressed noise hazards, hiring a certified assessor for thorough evaluations, and ensuring workplace safety in compliance with regulations. All tables should be numbered with Arabic numerals. Every table should have a caption. Headings should be placed above tables. Only horizontal lines should be used within a table, to distinguish the column headings from the body of the table, and immediately above and below the table. Tables must be embedded into the text and not supplied separately. Below is an example which the authors may find useful.

1.2 Objective of Study

This study provides a comprehensive classification of employees susceptible to excessive noise exposure, considering job roles, work areas, noise types, exposure levels, and the effectiveness of existing noise reduction measures. It aims to facilitate compliance with the 2019 Occupational Safety and Health (Noise Exposure) Regulations by identifying areas where noise levels surpass specified limits. Additionally, the study supports the mandatory conduct of Noise Risk Assessments in adherence to the Occupational Safety and Health (Noise Exposure) Regulations 2019.

1.3 Scope of Study

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2. Methodology

The level at which dangers are created at the workplace has a clear connection with the use of safety. It depends on a variety of variables, including the nature and severity of the task, the frequency of accidents, the environment, the people involved, the employees' and employers' educational backgrounds, the cost of implementation, and others. Therefore, the NRA's goal is to identify any workplaces or employees who are subject to excessive noise. The framework of process was provided.

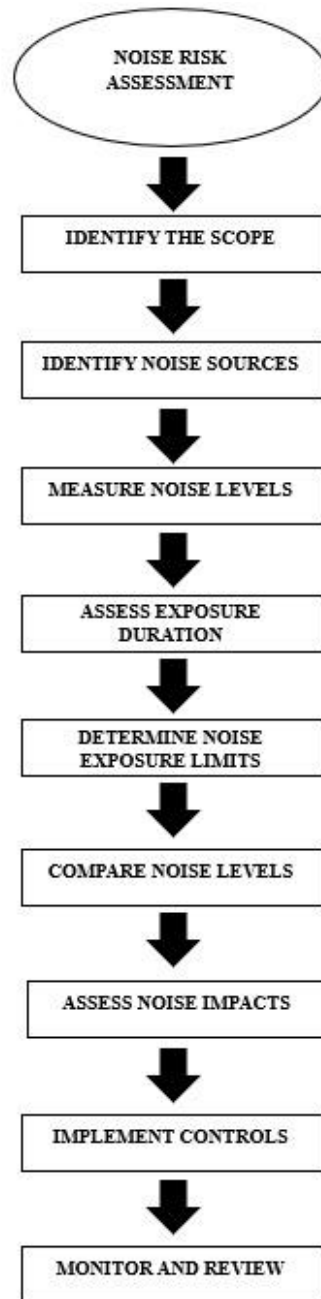


Figure 1 : Framework of the Methodology.

3. Result and Discussion

3.1 Noise Mapping

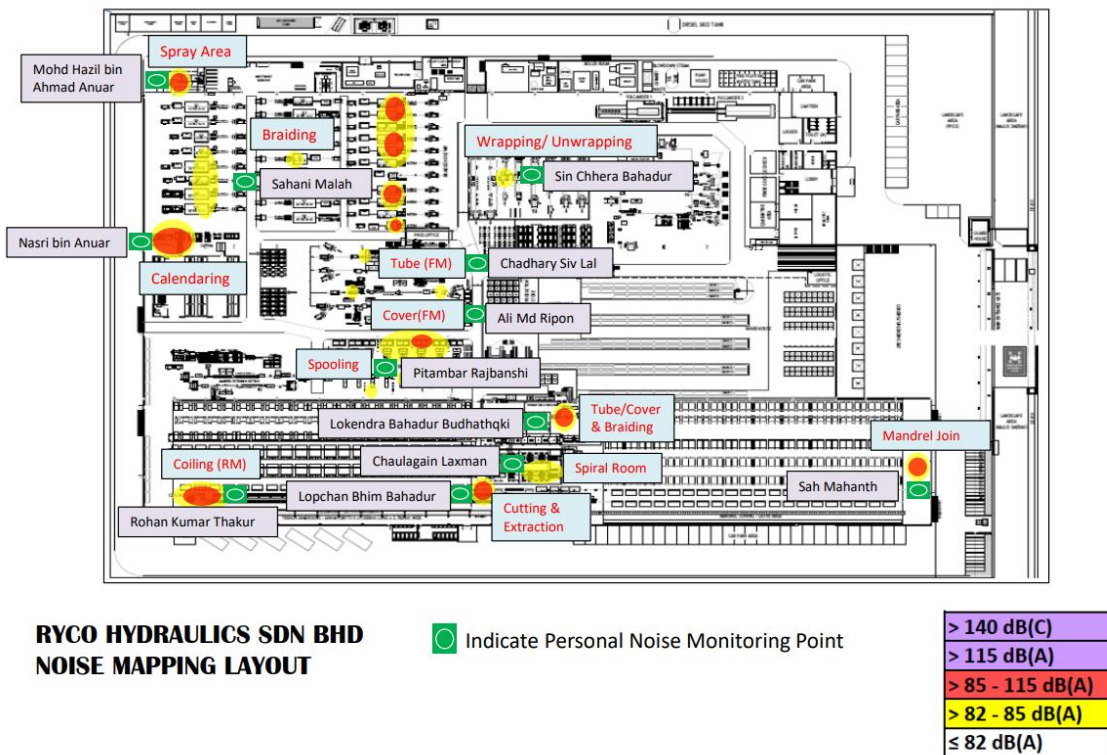


Figure 2 : Noise Mapping (Production Area)

This is the noise mapping of the production that runs in the factory area that produces high noise that needs to be done by the Noise Risk assessment (NRA) by the assessor. Most of the working areas in the factory produce quite high noise.

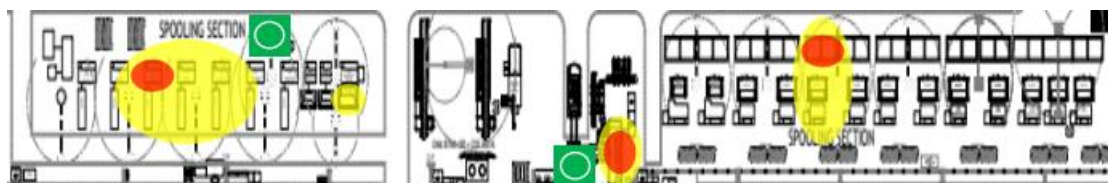


Figure 3 : Noise Mapping (Spooling Area)

The spooling area is one of the large working areas and affects quite loud and unpleasant noise. This effect of this spooling is used as a study area in this report.

3.2 Comparison Noise Level 2022 and 2023

Table 1 : Noise Level 2022 and 2023 on Spooling Area

Area	Noise Source	Noise Level (2022)	Noise Level (2023)
spooling	Spooling 1	78.6	76.4
	Spooling 2 (Front)	82.2	76.7
	Spooling 2 (Back)	83.2	78.9
	Spooling 3	85.4	74.6
	Spooling 4 (Front)	84.3	82.7
	Spooling 4 (Back)	83.7	89.1
	Spooling 5	81.5	76.2
	Spooling 6	84.8	71.3
	Spooling 7	76.5	73.9
	Spooling 8	75.4	74.9
	Spooling 10	77.7	77.5
	Spooling 11 (Front)	79.9	81.1
	Spooling 11 (Back)	79.9	81.8
	Spooling 12 (Front)	79.3	84.4
	Spooling 13 (Front)	81.7	82.8
	Spooling 13 (Back)	84.5	84.4
	Spooling 14 (Front)	81.5	82.5
	Spooling 14 (Back)	79.8	83.5
	Spooling 15	82.6	84.4
	Spooling 16	80.6	75.6
Spooling 17	80.2	79.5	
Spooling 18	79.0	79.4	
Spooling 19 (Front)	79.0	82.2	
Spooling 19 (Back)	79.0	80.7	

4. Conclusion

As conclusion, the conducted Noise Risk Assessment has furnished valuable insights into the potential dangers linked to occupational exposure to noise. Through a thorough examination of noise levels, exposure durations, and the utilization of personal protective equipment, a comprehensive understanding of the hazards facing employees has been achieved. The identification of areas with heightened risk and specific tasks contributing to increased noise levels will facilitate the implementation of focused control measures to alleviate potential health impacts. Furthermore, the assessment lays the groundwork for the establishment of an efficient noise management program, underscoring the significance of fostering employee awareness and education. Through a systematic approach to addressing noise-related risks, organizations can bolster workplace safety, safeguard employee well-being, and ensure adherence to pertinent regulations. Regular evaluations and adjustments to the Noise Risk Assessment will be pivotal in adapting control measures as needed and sustaining a secure and healthful work environment.

Acknowledgement

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