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[Presipitasi] Editor Decision (Revision Needed)

1 message

Bimastyaji Surya Ramadan <bimastyaji@live.undip.ac.id> Fri, Jun 17, 2022 at 7:06 PM
Reply-To: Bimastyaji Surya Ramadan <bimastyaji@live.undip.ac.id>
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Cc: Wiwik Budiawan <wiwikbudiawan@ft.undip.ac.id>, Pertiwi Andarani <andarani@ft.undip.ac.id>, Lare Demetria Agiasti <demetria.rere@gmail.com>

Title: Assessing Occupational Noise Exposure and Blood Pressure of Cabin Personnel of an Indonesian Diesel Train
Jurnal Presipitasi : Media Komunikasi dan Pengembangan Teknik Lingkungan

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Research article

Assessing Occupational Noise Exposure and Blood Pressure of Cabin Personnel of an Indonesian Diesel Train

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Abstract

Noise may cause serious health problems, including physiological responses specifically in the cardiovascular system. This study aims to assess occupational noise exposure and analyze the correlation between occupational noise and blood pressure in cabin and station personnel. The total number of participants was 30 cabin personnel (train drivers) and 30 station personnel. The cabin had a Leq of 90.3 dBA while the noise level at Poncol Station was still below the threshold limit value (TLV), i.e., 75.8 dBA. The noise exposure assessment also included a noise exposure profiling. Chi-square test showed that noise influenced changes in systolic and diastolic blood pressure. The train whistle had the greatest noise level at 120 dBA, according to the noise profile. Moreover, the use of a train whistle on a regular basis may raise the noise level exposure to cabin staff and even station workers. This study contributes to the body of scientific evidence that occupational noise might affect blood pressure.

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***Keywords**: occupational noise; train; cabin personnel; train driver; blood pressure*

1. Introduction

Railway is one type of land transportation service industries that is relatively more favorable in public (Hosoya, 1995). Rail services do not only have a positive impact on workers and the community, but there may also be a negative impact due to noise generated by the train (Eldakdoky and Elkhateeb, 2021; Hosoya, 1995). Train noise may be categorized as either airborne or structure-borne. Steel wheel/rail action, train siren/whistle, aerodynamic noise, power and auxiliary equipment, power units, and engines are all sources of airborne noise (Croy et al., 2013). With prominent frequencies primarily below 200 Hz, the structure-borne noise originates from vibro-acoustic sources emitted via vibration transmission into the train envelope from bogies and mounted equipment (Choi et al., 2004; Sujarwanto et al., 2014). Noise emitted by trains between wheels and rails is affected by the stability of the track supports, inadequate maintenance, and rail alignment (Evans et al., 2020).

The Indonesian railway is operated by a state-owned company, namely PT Kereta Api Indonesia (PT KAI). Although Indonesia's railway infrastructure is rapidly developing, PT KAI still operates 10–40 year-old locomotives (Iridiastadi, 2016). This may contribute to the noise level in cabin which commonly presents from 67 to 101 dBA with frequent train whistle uses to warn individuals who are walking along the rail track or reaching a level crossing (Iridiastadi, 2016). The locomotives do not have an air-conditioned cabin, and the design of the cabin does not take ergonomics into account (Iridiastadi, 2021), including how to reduce the noise exposure to the cabin personnel. The Indonesian railway safety has been evaluated by previous research (Bambang and Wiwik, 2013; Iridiastadi, 2021, 2016), but the noiseinduced health problem is rarely investigated by assessing the continuous noise exposure. This situation may affect the health of workers (cabin and station personnel) both psychologically and physiologically (Passchier-Vermeer and .Passchier, 2000).

People who are exposed to noise tend to have unstable emotions leading to stress (Budiawan et al., 2016; Hahad et al., 2019). Long-term stress can cause narrowing blood vessels, which leads the heart to work harder to pump blood throughout the body. In a long time, blood pressure will rise, and this is so-called hypertension. Hypertension is a health disorder that is often found in almost all countries (World Health Organization (WHO), 2013). Hypertension is still one of the leading causes of disease and mortality that can be avoided (James et al., 2014). The existence of a link between occupational noise exposure and hypertension is still up for debate (Chang et al., 2013). Noise can be also associated with the occurrence of hypertension (Chang et al., 2013; Hahad et al., 2019). However, inconsistent results have been reported by other studies (Fogari et al., 2001; Inoue et al., 2005; Kristal-Boneh et al., 1995) that could be caused by variations in research design, exposure measurement, the ability to adjust for possible confounders and levels of hearing-protective device use while working (Chang et al., 2013).

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Area Operation IV Semarang, also known as DAOP IV Semarang, is an Indonesian railway operations area operated by PT Kereta Api Indonesia (Persero) (Andarani et al., 2019). There is little information on occupational noise exposure inside the cabin and its impact on cabin personnel, particularly on DAOP IV. It is necessary to continuously measure occupational noise exposure at work so that noise level peaks are not missed. Therefore, this study aims to assess the occupational noise exposure of cabin personnel and to evaluate whether the exposure has an effect on the blood pressure. In order to eliminate confounding factors, this study was undertaken by a case-control approach.

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2. Methods

2.1 Subject of research and measurement time

Indonesian Railways Company operates trains with several types of locomotives, i.e., electric, diesel electric, diesel hydraulic, and multipower locomotives (https://www.kai.id/). The selected travel route is Semarang–Tegal and Tegal–Semarang, namely Kaligung train (code: CC201, CC203, and CC206). The locomotive type of Kaligung KA is diesel electric with technical data shown in Figure 1.

L*	1	2	RT	1	2	3	4	5	6	7	GT	L*
	Executive Class			Economic Class								

Figure 1. Schematic layout of the Kaligung train. Abbreviations: L*, Locomotive; RT, Restoration Train; GT, Train Generator/diesel engine

The population of this study was all officers at DAOP IV Poncol Semarang Station who were exposed to noise obtained from secondary data which was 213 people. The number of participants was 10–15% of the total population at UPT Crew Semarang, namely 30 people of which 30 cabin personnel for one work service (approximately 1 week). The research began in July the first week and second week of 2017. Measurements were carried out for three consecutive days from Friday to Sunday. The rotation of the work schedule is usually within a period of 2 months. Control variables in this study were age, gender, and heredity (uncontrollable risk factors), as well as nutritional status (obesity), smoking habits, alcohol drinking habits, coffee drinking habits, and disease history, years of service and use of personal protective equipment (PPE). Thirty station personnel also participated as the control subject.

2.2 Measurement of occupational noise exposure and blood pressure

The research stages include sampling and recording data using a noise dosemeter in the driver's cabin and station. Blood pressure measurement (systole and diastole) is carried out at the health post station with a digital sphygmomanometer (Omron 7203) equipped with Intellisense BPM feature which aims to determine the optimal level of inflation and deflation when measuring blood pressure. The noise measurement time was on Friday, Saturday, and Sunday. Health checks 45 minutes before and after the driver travels for 15 days. If there is an increase or decrease in blood pressure of ±10 mmHg after the driver and assistant engineer are exposed to noise, then it is considered as a change in blood pressure.

Noise Dosimeter is the use of a measuring instrument (dosimeter) that can be used/worn to calculate the noise exposure received during working hours. The noise dosimeter used in this investigation was the Lutron DS2013SD, which has the capability of being a noise data logger. Throughout the journey, the noise level exposure was taken every five seconds. This measurement was made in compliance with the Ministry of Environment Decree No. 48/1996 on Noise Level Thresholds. Measurements were made in the worker's hearing area, approximately 15 - 30 cm from the worker's ear. The measurement of noise data began at the initial departure station (Semarang Poncol Station) until it arrived at Tegal Station.

The threshold limit value (TLV) for the occupational noise according to the Indonesian Ministry of Labor No. 13/2011 and NIOSH (NIOSH, 1998) is 85 dB for 8 hours of work per day. Based on the results of the calculation of the Leq value, the modified NIOSH calculation was carried out to determine the recommended duration of noise exposure (Leq). The modified NIOSH equation is as follows:

$$T = \frac{16}{2^{(L-82)/3}} \qquad \text{(Eq. 1)}$$

where T is duration (hour), L is the exposure level (dBA).

2.3 Statistical analyses

Univariate and bivariate analysis was performed to determine the effect of noise level with changes in blood pressure before and after exposure to noise. The chi-square test was used to observe whether there was a relationship between two variables. The level of significance (p) used is 0.05. The analyses were conducted using Microsoft Office Excel 2010 and SPSS 16.

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3. Results and Discussion

3.1 Existing condition of rail track and the Kaligung Train

There are a total of 127 stations in Central Java Province, including 16 major stations (class 1) and 7 minor stations (class 2). These stations are controlled by three railway management institutions, which are under the control of PT KAI. The Kaligung Train (Route: Semarang–Tegal, roundtrip) is one of the trains under the control of DAOP IV Semarang City. In addition to controlling train operations, DAOP also regulates the environment around the station. One of them is a settlement located near the railroad tracks. Settlements must be 100 meters from the railroad tracks. This is to prevent train accidents and the risk of noise caused by railway activities. Based on the Railway Law No. 13/1992 with the derivative of Government Regulation No. 69/1998, the area around the 11-meter side of the railroad track is not allowed to carry out any activities other than train travel traffic.

3.2 Occupational noise exposure analysis

In this study, noise measurements were carried out in the cabin of the train driver of the Kaligung Train between Semarang and Tegal (roundtrip). The measurement during the train running on the first to third day had an average travel time of 4 hours 47 minutes, including when the train stops at the station to drop off or pick up passengers. Figure 2 shows measurement results of noise levels in the cabin which generated 3,458 data points in total. According to the Ministry of Labor Regulation No. 13/2011 that for 4 hours of work, the TLV of noise intensity is 88 dBA. In this study, the average noise in the cabin area is on the first day: 88 dBA, on the second day: 93 dBA, and on the third day: 90 dBA. In the station area, the average noise (Leq) was 75.88 dBA, with L10 (65,4 dBA), L50 (62 dBA) dan L90 (88 dBA).

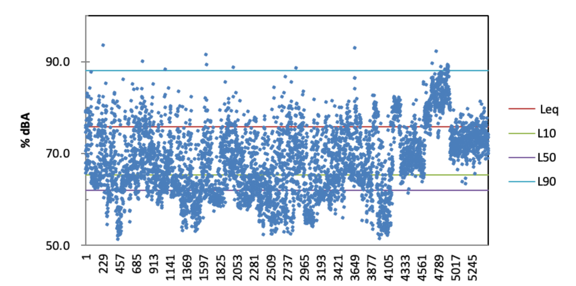

Figure 2. Noise exposure in the cabin (3,458 data points)

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According to the observation when continuously measuring the noise levels (Figure 2), the source of the noise, which was the most prominent risk to health, was when the driver used the train whistle because the noise according to the measurement was greater than 100 dBA, while the train whistle in the locomotive depot when the train stops was ~120dBA. At this level, the allowable duration was only 7 seconds. It should be noted that 140 dBA is already not acceptable at any duration according to the Regulation of Ministry of Labor No. 13/2011. Another source of noise was the sound of the train engine, which is ~80dBA and when the train is braking entering the station area or densely populated region, the noise level was ~70dBA. Sujarwanto et al. (2014) measured the CC201 noise levels inside the train driver cabin with open window, which reached 81.8 dBA and if the door was also opened, the noise level was 83.4 dBA. It should also be noted that the position of cabin personnel relative to the engine may also affect the noise exposure as the train moves. The train driver can be located either behind the engine or in front of the engine.

Figure 3 illustrates descriptive statistics of the noise levels exposed to cabin personnel. It can be seen that 70 to 75 dBA was exposed to the crew at 6.9% of the time on the first day, 2.4% on the second day, and 4.8% on the third day. Furthermore, 34.5% of the time was exposed to 85 dBA on the first day, 41.2% on the second day, and 40.1% on the third day.

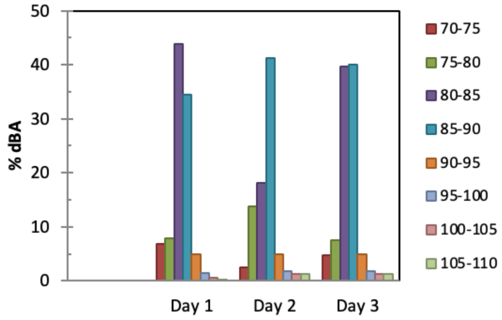


Figure 3. Summarizing diagram of noise levels in the cabin

In Figure 4a, it can be seen that the L10 was greater than the Leq on the first and second days, while the level was almost the same as the Leq value on the third day. According to FHA (2006), L50 is the average noise level during the measurement. Meanwhile, L10 describes the initial noise level and L90 is the residual noise level. The L50 values on the first, second, and third days were at a level below Leq, ranged from 84 dBA to 89 dBA, while the L90 value was at 76 dBA to 79 dBA. The noise level in the station area can be seen in Figure 4b. The Leq at the Poncol station was 75.88 dBA with L10 (65.4 dBA) L50 (62 dBA), and L90 (88dBA). It can be interpreted that the noise level at the train station still met the TLV.

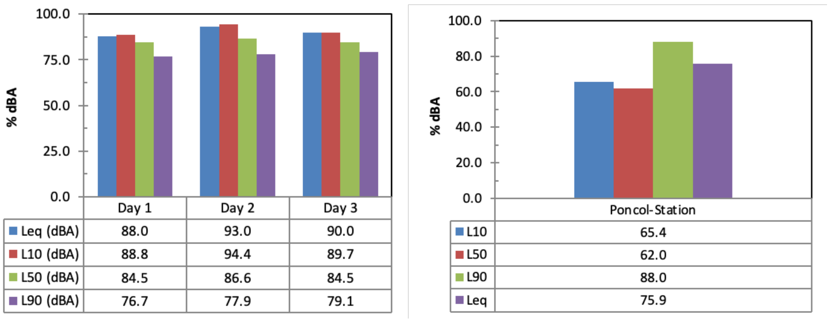


Figure 4. Noise statistics: (a) in the cabin; (b) in the Poncol Station

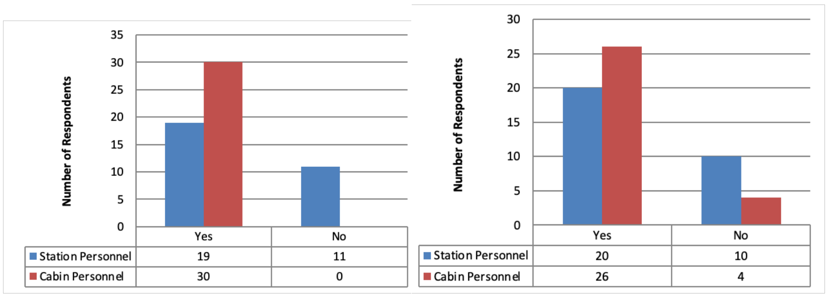
Based on Equation 1, the maximum duration of each Leq was determined. The maximum durations that were allowed to the noise exposure on day one, two and three were 4.24, 1.26, and 2.52 hours, respectively. On the day one, because the working time was 5 hours, it was exceeded the recommended duration at the Leq of 88 dBA (4.24 hours). It even greatly exceeds the maximum duration on the second and third days, as shown in Table 1.

Table 1. The threshold limit value of the maximum exposure.

	Leq (dBA)	T max (hours)	Notes
Day-1	88	4.24	Exceeded the recommended duration
Day-2	93	1.26	Exceeded the recommended duration
Day-3	90	2.52	Exceeded the recommended duration

3.3 Effect of the occupational noise on blood pressure

Figure 5a shows the increase in systolic blood pressure in cabin personnel after work. All cabin personnel (30 respondents) had an increase between before and after work. The increase was between 10 and 20 mmHg. Meanwhile, in station personnel, there was an increase in 19 respondents from 30 respondents. The increase in systolic blood pressure was not too significant; only between 5 to 10 mmHg and 11 station personnel surveyed had blood pressure that remained or even decreased from blood pressure before work. In diastolic blood pressure (Figure 5b), both groups of respondents experienced changes in diastolic blood pressure. The number of respondents who experienced an increase was more evident in cabin personnel than station personnel. To see the relationship between the independent and dependent variables, this study used cross-tabulation and chi-square test.



(a) (b)

Figure 5. Elevated blood pressure of cabin and station personnel: (a) Systolic; (b) Diastolic

Table 2 showed that in the environment with an intensity above the TLV, there were 30 people (100%) who experienced an increase in systolic blood pressure. While in the group who worked in an environment with noise intensity below the TLV, there were, in 20 respondents, only 19 (63.3%) experienced an increase in systolic blood pressure (p-value <0.05), thus it can be concluded that there was an effect of noise level on increasing blood pressure.

Table 2. Correlation between noise intensity in the workplace and an increase in systolic blood pressure in the respondents of PT KAI

Noise Level	Elevated blood pressure				Total		p-Value
	Yes		No				
	n	%	n	%	N	%	
Exceed Threshold Limit Value	30	100	0	0	30	100	< 0.05
Below Threshold Limit Value	19	63	11	37	30	100	
Total	49		11		60		

Table 3. Correlation between noise intensity in the work environment with an increase in diastolic blood pressure in the respondents of PT KAI

Noise Intensity	Elevated blood pressure				Total		p-Value
	Yes		No				
	n	%	n	%	N	%	
Exceed Threshold Limit Value	26	86.7	4	13.3	30	100	< 0.05
Below Threshold Limit Value	20	66.7	10	33.3	30	100	
Total	46		14		60		

According to Table 3, from 30 respondents who worked in an environment with an intensity above the TLV, there were 26 respondents (86.7%) who experienced an increase in diastolic blood pressure. Although in the group who worked in an environment with noise intensity below the TLV, only 20 out of 30 respondents (66.7%) experienced an increase in diastolic blood pressure (p-value <0.05). Therefore, it is evident that there is an effect of exposure to noise on elevated blood pressure.

This study confirms once again that the occupational noise may affect blood pressure. Sutiningsih et al. (2020) also had the same result, although the authors did not reveal the actual noise levels. Weinmann et al. (2012) found that exposure to objective personal noise affected the hypertension. An systematic review of articles published after 1999 reported that occupational noise was consistently associated with an elevated risk of the occurrence of hypertension [hazard ratio (HR) = 1.68; 95% confidence interval (CI) 1.10-2.57] (Skogstad et al., 2016).

4. Conclusions

Noise level profiling and blood pressure (before and after work) analysis revealed that the noisy environment above the threshold limit value (TLV) could affect the health of cabin personnel. The noise intensity in the cabin had a Leq of 90.3 dBA. The noise level at Poncol Station was still below the TLV, namely 75.8 dBA, although indeed this level almost reached the TLV (85 dBA for 8 working hours). Noise profiling verified that train whistle had the highest noise level at ~120 dBA. The frequent use of the train whistle can increase the noise level exposure to the cabin crew and even the station personnel.

Based on the chi square test, there is an effect between noise and an increase in systolic blood pressure (p-value < 0.05) and diastolic blood pressure (p-value < 0.05). The elevated blood pressure due to occupational noise were 100% for cabin crews and 63% for station personnel in systolic, while in diastolic, the ratios were 87% for cabin personnel and 67% for station personnel. The paired sample t-test also showed that there was a difference in blood pressure between systolic blood pressure before and after work (p-value < 0.05).

The layout of the CC201 train may have different potential noise exposures to the train driver, specifically during running. A further study should be conducted to design an optimal reduction in noise exposure, either by technology or management.

5. Acknowledgement

The authors would like to thank the students who participated in this study, namely Ms. Icha and Ms. Yella. This study was partially funded by RKAT Fakultas Teknik Universitas Diponegoro 2017.

6. References

Andarani, P., Desinta, I., Budiawan, W., Syafrudin, S., Hadiwidodo, M., Huboyo, H.S., 2019. Noise exposure assessment and estimated excess risk of cabin personnel in the locomotive-cc205. Indian J. Public Heal. Res. Dev. 10, 789–794.

Bambang, P., Wiwik, B., 2013. An insight review of Indonesia railway accidents: Preliminary Study on Indonesia Railways Datamining. In: International Conference on Information Systems for Business Competitiveness (ICISBC 2013). pp. 421–423.

Budiawan, W., Ulfa, E.A., Andarani, P., 2016. Analisis Hubungan Kebisingan Mesin dengan Stres Kerja (Studi Kasus: Mesin for one twister (TFO) PT XYZ). J. Presipitasi Media Komun. dan Pengemb. Tek. Lingkungan, 13, 1–7.

Chang, T.Y., Hwang, B.F., Liu, C.S., Chen, R.Y., Wang, V.S., Bao, B.Y., Lai, J.S., 2013. Occupational noise exposure and incident hypertension in men: A prospective cohort study. Am. J. Epidemiol. 177, 818–825.

Choi, C.W.S.L., Cho, J.H., Choi, S., Lee, C., Kim, J., 2004. Interior Noise of a Korean High-Speed Train in Tunnels. Acoustics 415–420.

Croy, I., Smith, M.G., Waye, K.P., 2013. Effects of train noise and vibration on human heart rate during sleep: An experimental study. BMJ Open 3, 1–9.

Eldakdoky, S., Elkhateeb, A., 2021. Noise levels inside the coaches of Greater Cairo tunnel metro, line 3 tunnel. Front. Archit. Res. 10, 410–419.

Evans, T., Falbe-Hansen, K., Martini, N., Juul-Sorensen, N., Tabarra, M., Winther, K., 2020. Cityringen Metro, Copenhagen, Denmark: An expansion to the Danish capital's metro system using passenger-centred design. Arup J. 55, 5–15.

Federal Highway Administration (FHA, US Department of Transportation, 2006. Sound Level Descriptor [WWW Document]. FHWA-HEP-17-053. URL https://www.fhwa.dot.gov/Environment/noise/resources/fhwahep17053.pdf. (accessed 6.11.22).

Fogari, R., Zoppi, A., Corradi, L., Marasi, G., Vanasia, A., Zanchetti, A., 2001. Transient but not sustained blood pressure increments by occupational noise. An ambulatory blood pressure measurement study. J. Hypertens. 19.

Hahad, O., Kröller-Schön, S., Daiber, A., Münzel, T., 2019. The cardiovascular effects of noise. Dtsch. Arztebl. Int. 116.

Hosoya, E., 1995. Environmental issues concerning Japanese railways. Rail Int. 38–48.

Inoue, M., Laskar, M.S., Harada, N., 2005. Cross-Sectional Study on Occupational Noise and Hypertension in the Workplace. Arch. Environ. Occup. Health 60, 106–110.

Iridiastadi, H., 2016. Railway operations and safety in Indonesia: a descriptive study. Comput. Railw. XV Railw. Eng. Des. Oper. 1, 389–397.

Iridiastadi, H., 2021. Fatigue in the Indonesian rail industry: A study examining passenger train drivers. Appl. Ergon. 92, 103332.

James, P.A., Oparil, S., Carter, B.L., Cushman, W.C., Dennison-Himmelfarb, C., Handler, J., Lackland, D.T., LeFevre, M.L., MacKenzie, T.D., Ogedegbe, O., Smith, S.C., Svetkey, L.P., Taler, S.J., Townsend, R.R., Wright, J.T., Narva, A.S., Ortiz, E., 2014. 2014 Evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the Eighth Joint National Committee (JNC 8). JAMA - J. Am. Med. Assoc. 311, 507–520.

Kristal-Boneh, E., Melamed, S., Harari, G., Green, M.S., 1995. Acute and chronic effects of noise exposure

on blood pressure and heart rate among industrial employees: the Cordis Study. Arch. Environ. Health 50, 298–304.
Lu, S.Y., Lee, C.L., Lin, K.Y., Lin, Y.H., 2018. The acute effect of exposure to noise on cardiovascular parameters in young adults. J. Occup. Health 60, 289–297.
NIOSH, C., 1998. Occupational Noise Exposure (Revised Criteria 19980, Criteria for a Recommended Standard. Cincinnati, United States of America.
Passchier-Vermeer, W., .Passchier, W.F., 2000. Noise Exposure and Public Health. Environ. Health Perspect. 108, 123–131.
Sbihi, H., Davies, H.W., Demers, P.A., 2008. Hypertension in noise-exposed sawmill workers: a cohort study. Occup. Environ. Med. 65, 643 LP – 646.
Skogstad, M., Johannessen, H.A., Tynes, T., Mehlum, I.S., Nordby, K.C., Lie, A., 2016. Systematic review of the cardiovascular effects of occupational noise. Occup. Med. (Lond). 66, 10–16.
Sujarwanto, T., Prajitno, G., Yuwana, L., 2014. Kebisingan di Dalam Kabin Masinis Lokomotif Tipe CC201. J. Sains dan Seni ITS 3, B101–B106.
Sutiningsih, D., Filaely, P., Udiyono, A., Wijayanti, E.P.N., 2020. Analysis of Noise Factors in Increasing Blood Pressure of Railway Employees in Semarang Poncol Train Station. Adv. Heal. Sci. Res. 25, 214–227.
Weinmann, T., Ehrenstein, V., Von Kries, R., Nowak, D., Radon, K., 2012. Subjective and objective personal noise exposure and hypertension: An epidemiologic approach. Int. Arch. Occup. Environ. Health 85, 363–371.
World Health Organization (WHO), 2013. High blood pressure: a public health problem [WWW Document]. URL http://www.emro.who.int/media/world-health-day/public-health-problem-factsheet-2013.html (accessed 6.11.22).

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[Presipitasi] Editor Decision (Accepted)

1 message

Bimastyaji Surya Ramadan <bimastyaji@live.undip.ac.id> Sun, Jun 19, 2022 at 9:18 PM
Reply-To: Bimastyaji Surya Ramadan <bimastyaji@live.undip.ac.id>
To: Pertiwi Andarani <andarani@gmail.com>
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