

# Eliminating Unsafe Behaviour Through the Implementation of Nudge Theory in Indonesian Industry

**Andri Prabowo and Danu Hadi Syaifullah**

Department of Industrial Engineering

University of Indonesia

Depok, Indonesia

[andri.prabowo71@ui.ac.id](mailto:andri.prabowo71@ui.ac.id), [danu\\_syaifullah@yahoo.co.id](mailto:danu_syaifullah@yahoo.co.id)

## Abstract

The high number of occupational accident and work-related disease in the world, including Indonesia is still at alarming rate. Over the time, experts are trying to find a way to lower the occupational accident rate all around the world by developing several research about the major cause of it. Current findings shows that one factor that massively contributes to the numbers of occupational accident is unsafe behaviour. Hence, by eliminating unsafe behaviour, it would make the most occupational accidents disappear. This research will introduce ‘nudge’ as a gentle behavioural push to improve safety culture in the industry. As this research objective is to eliminate unsafe behaviour using nudge in Indonesian Industry with the aim to reduce hearing risk, we will see that nudge can be integrated with safety management systems and safety culture paradigm to focus on health and safety at work. This research will also give proof, that nudge can effectively eliminate unsafe behaviour based on convincing and free will instead of rules and instructions. The nudge implementation will be demonstrated through daily hearing check using audiometry pure tone testing.

## Keywords

Occupational Accident, Unsafe Behaviour, Safety Culture, Nudge Theory, and Audiometry Pure Tone Testing.

## 1. Introduction

The International Labour Standards on Occupational Safety and Health (ILO) Constitution sets forth the principle that workers must be protected from sickness, disease and injury arising from their employment. According to recent estimates released by the International Labour Organization, each year 2.78 million workers die from occupational accidents and work-related diseases (of which 2.4 million are disease-related) and an additional 374 million workers suffer from non-fatal occupational accidents (Wadsworth and Walters 2019). The same situation also occurred in Indonesia, given the fact that the high amount of accident rate is inevitable with an average of 470 occupational accidents occurred every day (BPJS 2018).

Over the time, people are trying hard to find a way to lower the accident rate all around the world. After technology, standards and compliance were introduced since the nineteen fifties to improve safety in industry, it has been successfully led to the drops in incident rates (Hudson 2007). However, the occupational accident rate is still at alarming rate in Indonesian industry, where the increased percentage reaching over 40% from 123.000 cases in 2017 to 175.000 cases in 2018, despite the government has trying to adopt ISO OHSAS 18001 about the occupational health and safety system, in which did not go very well (Ariefana and Bhayangkara 2019).

Several research about the causes of occupational accident have been developed before based on the immediate causes and basic causes. One factor that massively contributes to the high number of accident rates is unsafe behaviour (Chincilla 2002). According to the immediate cause research, the immediate cause-unsafe behaviour most frequently mentioned in the occupational accident cases were lack of safety measures and not using personal protection equipment (PPE). This were followed by 10 other causes such as inadequate position for the task, inadequate load, ineffective warnings, inadequate lifting, use of defective equipment, inadequate positioning, making the safety instrument inoperable, inappropriate operating or handling speed, adjusting equipment while operating, and doing maintenance when the equipment is operating (González et al. 2016). Given the fact that unsafe behaviour has numerous factor that caused the occupational accident, clearly it will need a special attention for the industry.

In order to eliminate unsafe behaviour, first we have to understand the root cause of the problem, for example the factor with most occurrence in the immediate cause of unsafe behaviour. Based on the previous paragraph, the research of immediate causes showed that accidents were mainly caused by unsafe behaviour, representing 74%, which were caused by human error, with people not following safety practices and procedures, and not being aware that they may have an accident when they conduct those activities (González et al. 2016). With this manner, obviously having a safety behaviour has become an important factor for the industry. The safety culture paradigm (Hudson 2007) as seen in Figure 1, got established around 2000 as the alternative and innovation that started with the emergence of behaviour-based safety beforehand. At the same time, concepts of ‘*prevention through design*’ emerged as the solution to eliminate hazards in the industry. Therefore, if we eliminate unsafe behaviour, it will make the most occupational accidents disappear as current insights show that people are not always following logic when doing something or making a decision as their behaviour (Lindhout and Reniers 2017).

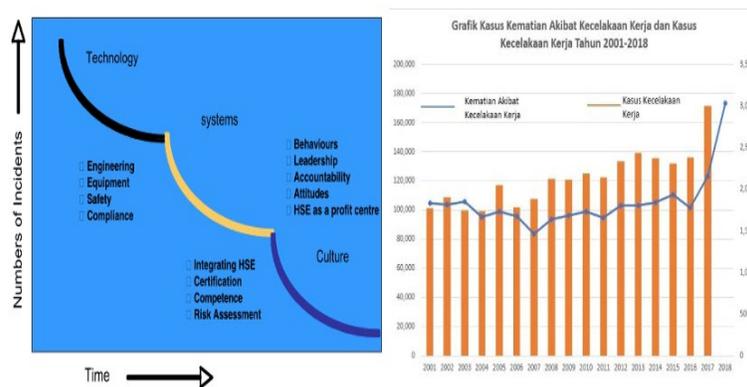


Figure 1. The contrast of safety culture and accident rate in Indonesia

Controlling the behaviour of people can be achieved through practice that leads to ‘influence strategies’ to point out but not enforce people’s choice in the better direction as perceived by them. These strategies can be referred as nudges; as a gentle behavioural pushes as it is based on convincing and free will instead of rules and instructions.

The one example of it is how to improve and eliminate unsafe behaviour of people working in the manufacturing industry. The data shown about the proportion of occupational work accident in Indonesia for the manufacturing industry that reached 32%, the same level as construction sector, followed by transportation (9%), forestry (4%), mining (2%), and others sector (Suhendra 2015). Therefore, it indicates that occupational work accident in manufacturing industry needs serious attention, especially if they have a poor work environment such as excessive noise levels, exposure to fumes and dust and poorly maintained equipment which can lead to contributory factors of unsafe behaviour (Kifle et al. 2014).

One of the manufacturing company in Indonesia, PT. Sunter Inti Megah (PT. SIM) that focuses on iron manufacturing and lathe workshop have the possibility of being exposed to a poor work environment. During their 8 hours of work shift every weekday and 4 hours of work shift on Saturday, the workers continuously being exposed by high noise level from the running machine. Not to mention where some of them didn’t even bother to wear a protective equipment, such as earplugs to help the reduce the noise and prevent hearing risk. With the noise level can reach over 92 dB constantly during their work shift, a proper safety management system is very much needed for their worker.

Obviously, nudge can be implemented to focus on health and safety at work with the possibility of improvement. This implies that any personnel in the industry can be influenced by nudge to have a positive behaviour in a various ways without forcing them to do so. On the other hand, making safe behaviour as a habit leads to behaviour change and since people are rewarded, their behaviour is more likely to be repeated even if lack of rule compliance has its own adverse effects on safety. Therefore, it become clear that nudge can and must be integrated with safety management systems to improve safety culture in the Indonesian Industry.

## 2.1 Objectives

To eliminate unsafe behaviour through implementing a suitable nudge for the Indonesian industry, so it can lower the number of accidents in the workplace. This research will also map the safety behaviour of the worker before and after the implementation to determine the effectiveness of the designed nudge on site.

## 2. Literature Review

### 2.1 Nudge Theory

Originally, nudge was introduced by Richard Thaler and Cass Sunstein under the scope of behavioural economics. Later, they defined nudge as an aspect of the choice architecture that alters or influence people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. As the definition is considered too broad, then we need to understand that in order to count something as a nudge, the treatment or intervention must be easy and cheap to avoid. We also need to understand that Nudges are not mandates. For example, when we put fruit at eye level, then it counts as a nudge. However, banning junk food does not count as a nudge since it is considered as a mandate (Sunstein et al. 2008).

As a matter of fact, nudge is a behavioural bias that improve the wellbeing of people, where the individual is considered as free to choose differently than the 'nudge' intent. People tend to avoid making choices because they are not strictly rational beings, so they go for the default or normal option more often than a rational being would do (Lindhout and Reniers 2017). We also need to understand that nudge act as a gentle push and thus creating such human behaviour that can be influenced by an unimportant circumstance. As nudge is based on free will, we need to understand how people think, behave, and choose.

### 2.2 Unsafe Behaviour

Unsafe behaviour is an intentional violation of standard procedures that may lead to errors (Reason et al. 1990). Based on the research, they generated two types of unsafe behaviour which are errors and violations. Later in 1997, a study (Mason 1997) conducted a study that described unsafe behaviour as an individual's likelihood of not following standard safety rules, procedures, instructions, and specified criteria for work imposed the organization.

The worker's unsafe behaviours can derive from violations, that are generally due to the departure of planned actions from some satisfactory path towards a desired goal (Lawton 1998, Mesken et al. 2002). Hence, it can be concluded that unsafe behaviour raised as a consequence of standardized procedures violation in which is also a reflection of a system weakness generated by human behaviour.

### 2.3 Noise Induced Hearing Loss (NIHL)

Noise Induced Hearing Loss (NIHL) is a defect caused by the exposure to sound levels or durations that damage the hair cells of the cochlea inside the ear. At the first stage of NIHL, the noise exposure may cause a temporary threshold shift—that is, a decrease in hearing sensitivity that typically returns to its former level within a few minutes to a few hours. This experience is often neglected by some people because they already know that they hearing capability will get back to normal soon. In fact, repeated exposures lead to a permanent threshold shift, which is an irreversible sensorineural hearing loss that they will not expect at the beginning.

There are several causes of hearing loss. One of them is hearing loss that caused by sociocusis (non-occupational noise exposure) that includes recreational and environmental noises (e.g., loud music, guns, power tools, and household appliances) that affect especially the middle to inner ear. Working in a manufacturing industry would be very familiar with the noise as a contributing factor in industrial accidents such as hearing loss (Zohar et al. 1980).

## 3. Methods

### 3.1 Assess the Situation on Hand

Researcher conducted a situation assessment to understand the current situation by giving an initial survey to 16 workers at PT. Sunter Inti Megah. The initial survey was divided into two main contents which are the background information of the workers (name/initial, education level, marital status, work duration) and few questions to find the core of the problem (noise exposure level problem, willingness to wear PPE).

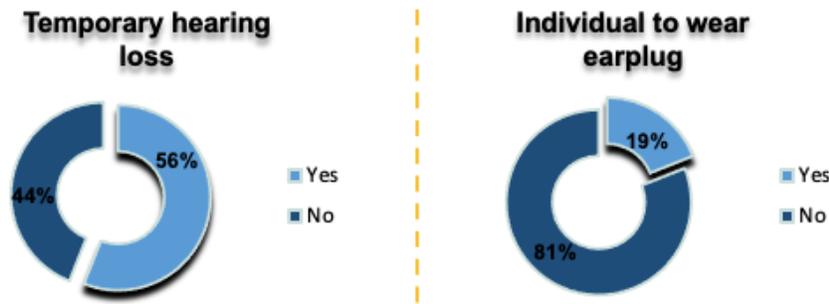


Figure 2. Initial survey result

The initial survey was also supported by an interview with the CEO of PT. Sunter Inti Megah, Liliana Yusnita. The quick conclusion of the interview stated that the noise level was very excessive, but the worker still did not bother to wear PPE (earplug). After conducting several interview sessions with the worker, researcher was able to conclude several points, as charted in Figure 2, as follows:

- They are not aware of the consequences of continuously being exposed to high noise level.
- It is not comfortable to wear earplug while working.
- They are not aware that their safety culture is considerably low.

As the final measure of situation assessment, researcher also conducted NIOSH recommended exposure limit (REL) for occupational noise exposure to show that the noise level at PT. Sunter Inti Megah exceeds the limit and put the workers in danger. Based on the calculation, we found out that the 8-hour time weighted average (TWA) of NIOSH REL for occupational noise at PT. SIM exceeded the 85 dB standard.

### 3.2 Focus on Individual Worker’s Behaviour

The Loughborough Safety Culture Assessment Toolkit was designed to measure the safety culture of the worker at PT. Sunter Inti Megah. The type of the questionnaire is a 43 question set using likert scale starting from 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (strongly agree). In general terms, the attitude measures, or dimensions, used in this toolkit fit into the following four broad areas and nine specific dimensions. To classify the score after processing the Loughborough Safety Climate Assessment Toolkit (LSCAT), this research used a system rating developed by (Sudarmo and Arifin 2018). This system consists of 5 categories, as shown in Table 1.

Table 1. System rating for LSCAT

Flag	Score	Description
<b>Red (Alarming)</b>	<b>0 – 2.0</b>	Safety value is not well-internalized within the individual and the company. Worker is disengaged with the safety effort and need serious effort to internalize safety value to all employee
<b>Amber (Weak)</b>	<b>2.1 – 4.0</b>	Safety value is reactive and lacking in initiative. Management or individual acts decisively in safety matters only if the incident have occurred
<b>Purple (Average)</b>	<b>4.1 – 6.0</b>	Safety culture appeared in the company due to the worker involvement toward safety. Seen both by worker and management as an important thing to achieved good safety performance
<b>Blue (Strong)</b>	<b>6.1 – 8.0</b>	Strong safety value. Company is active attention, care and action, in preventing workplace incidents. Worker and management are found to be working in harmony to improve safety
<b>Green (Excellent)</b>	<b>8.1 – 10</b>	Safety value is internalized in every individual and the company. Company continues to invest in safety not only in the workplace but outside of work as well. Workforce is found to be leading the safety improvement effort.

As this treatment act as initial assessment (assessment 1) for the worker before implementing the nudge, this assessment was given to 25 workers at PT. Sunter Inti Megah. The score of this questionnaire should be the baseline of this research before implementation.

### 3.3 Select a Nudge Type

Potentially, all nudge type can be used for safety application but still lack of proof until now. This research chose the present-bias preference as the selected nudge for safety application. The present bias preference nudge can show that immediate outcome (short-term) is influencing behaviour more than a long-term effect. We tend to underweight delayed outcomes and lack of direct result is critical for prevention of occupational disease in situations with long duration exposure.

The main tool of the nudge was a bulletin board for them to discuss and compare the result with other workers which later will trigger opinion and discussion within the community. The discussion will create fear for those we experience the decrease of hearing capability. In contrary, those we experienced increase or stable hearing capability will feel relieved. Furthermore, the author will also conduct a personal induction each time they receive hearing check to make sure they understand how to interpret the result. Audiometry pure tone testing was conducted as a daily hearing check routine for the worker at PT. Sunter Inti Megah to find the immediate behavioural response.

### 3.4 Design, Construct, and Pre-Test the Nudge

This research was conducted in a metal manufacturing company in Indonesia (PT. Sunter Inti Megah) that employed approximately 25 workers. All of the workers that directly involved with metal fabrication in the factory were chosen to involve in this research. Audiometry pure tone testing began one day after the researcher gave Loughborough Safety Culture Assessment Toolkit to the 25 workers at PT. Sunter Inti Megah and prolonged for one month. Every day during the experiment period, a participant of 6 workers from the factory were scheduled and given two pure tone audiometric testing, one before starting their work shift in the morning (08.00 AM), and one after the work shift end (05.00 PM). The testing was conducted in a quiet room of an administrative building adjoining the site where these workers were located to work. This site was chosen for two reasons:

- The proximity to the workers job sites can save the time for their reporting of the audiometric pure tone testing at the end of the work shift. The time elapsed between leaving their workstations and completing their post-exposure audiograms was never exceeding 25 minutes for any worker.
- It provided a reasonably quiet area to assure as little interference as possible in the hearing test.

Each worker's pure tone audiometric testing test took 4 – 5 minutes including the induction by explaining the threshold hearing levels on an automatic generating audiogram from by <https://hearingtest.online>. Audiograms obtained at the beginning of the work shift (pre-exposure) were compared to those obtained at the end of the work shift (post-exposure).

The result of the audiogram was given to the worker through the special bulletin board in the worker's break room wall. Noted on the bulletin board were the worker's name, test date, hearing result, notes, hearing category indicator, and information on earplug usage. This will allow the workers to discuss their result each day with their colleagues without any interference.

### 3.5 Implement the Nudge

The daily hearing check result before work shift and after work shift were posted through a designed bulletin board. This bulletin board will be the main tools for nudging the 25 workers at PT. Sunter Inti Megah to actually see their own hearing result and increase their awareness of this issue. It is placed in the worker's break room so they can discuss and privately see their hearing result without any interference and compare their results to one another.

The 25 x 20 bulletin board was filled with some necessary information regarding the hearing check results. The row contains the name of 25 workers, while the column contains the date for one month. Each day, researcher will fill the column of the selected six workers that underwent the test in that day. The bulletin board will show the highest volume (in decibel) that the subject can hear in the test based on the audiograms, then we categorized the result based on mild hearing loss, moderate hearing loss, and severe hearing loss. We also made classification based on the increasing or decreasing decibel before work shift and after work shift:

- Before work shift > After work shift: Green flag
- Before work shift < After work shift: Red flag
- Before work shift = After work shift: Yellow flag

Researcher will also collect and information whether the subject did or did not wear an earplug in that day.

Hearing test using audiometry pure tone testing was used as a supporting tools to nudge the 25 workers at PT. Sunter Inti Megah. The test will take place before work shift and after work shift to generate an audiogram. Tester will also give an explanation regarding the hearing result, especially in the after work shift hearing check.

### 3.6 Evaluate the Nudge

In order to answer the research objective which is to eliminate unsafe behaviour using nudge, researcher need to validate the effectiveness of the implemented nudge. Researcher gave the same Loughborough Safety Climate Assessment Toolkit (LSCAT) as assessment 2 to find their new safety climate score on each 9 dimensions. The result of assessment 2 will then be compared to the assessment 1 to find whether to score is increasing or not.

At the outset of this study, data that reflects the frequency of earplug use (PPE) were collected for all 25 workers at PT. Sunter Inti Megah for a period of one month. Walk-through tours of all work stations in the factory site were made and repeated at random times. The number of workers found to be wearing protectors of the total number observed was recorded in every tour to compare the improvement before and after the implementation.

## 4. Data Collection

### 4.1 LSCAT Assessment 1

Figure 3 is the scatter plot of Loughborough Safety Climate Assessment Tools (LSCAT) 1. This assessment was assigned to all 25 workers at PT. Sunter Inti Megah as the initial assessment to find their current score before nudge implementation.

### 4.2 LSCAT Assessment 2

Figure 4 is the scatter plot of Loughborough Safety Climate Assessment Tools (LSCAT) 2. This assessment was assigned to all 25 workers at PT. Sunter Inti Megah as the final assessment to find their improved score after nudge implementation

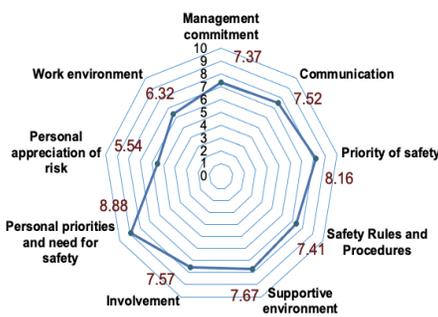


Figure 3. Radar plot of LSCAT assessment 1

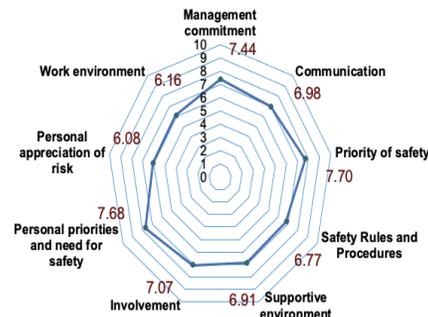


Figure 4. Radar plot of LSCAT assessment 2

### 4.3 Frequency of Earplug Usage

The data reflecting the frequency of earplug use were collected for all 25 workers at PT. Sunter Inti Megah for a period of one month. Due to the COVID-19 pandemic, the management has created a group system where each worker will have to work for 2 or 3 times a week and will be replaced by another worker in the follow up. Therefore, from the initial 25 workers, only 11-13 workers present each day to work. Table 2 is representing the frequency of earplug usage for all 25 workers.

Table 2. Frequency of earplug usage

Date	Total Worker	Worker Wearing Earplug	Use Percentage
03/11/20	13	1	8%
04/11/20	13	1	8%
05/11/20	13	2	15%
06/11/20	12	4	33%
09/11/20	13	3	23%
10/11/20	11	3	27%
11/11/20	11	2	18%
12/11/20	12	2	17%
13/11/20	11	2	18%
16/11/20	11	3	27%
17/11/20	11	5	45%
18/11/20	11	5	45%
19/11/20	11	5	45%
20/11/20	11	6	55%
25/11/20	11	6	55%
26/11/20	11	6	55%
27/11/20	11	4	36%
30/11/20	13	7	54%
01/12/20	13	6	46%
07/12/20	12	8	67%

## 5. Results and Discussion

### 5.1 Numerical Results

The Loughborough Safety Climate Assessment Toolkit (LSCAT) is useful to evaluate and answer the previous research objective which is to eliminate unsafe behaviour using nudge in Indonesian industry with the aim to reduce hearing risk. In general, the Loughborough Safety Climate Assessment Toolkit (LSCAT) overall score improved after the nudge implementation. As shown in Table 3, after one month of implementation on daily hearing check, the LSCAT score raised 0.41 from 6.98 before nudge implementation to 7.38 after nudge implementation. The 7.38 score can be flagged as strong based on (Sudarmo and Arifin 2018). The strong category can be described that the safety value at PT. Sunter Inti Megah after the nudge implementation are strong. The community there is actively paying attention, caring and acting, in preventing workplace incidents. Both Workforce and management are found to be working in partnership to improve safety at PT. Sunter Inti Megah. This statement is strengthened by the fact that almost all of the dimensions including, **communication, priority of safety, safety rules and procedures, supportive environment, involvement, and personal priorities and need for safety** have improved after the nudge implementation and flagged as strong or excellent.

Table 3. LSCAT score before and after nudge implementation

Dimension	LSCAT 1	Flag	LSCAT 2	Flag	Difference
Management commitment	7.44	Strong	7.37	Strong	-0.07
Communication	6.98	Strong	7.52	Strong	0.54
Priority of safety	7.70	Strong	8.16	Excellent	0.46
Safety Rules and Procedures	6.77	Strong	7.41	Strong	0.64
Supportive environment	6.91	Strong	7.67	Strong	0.76
Involvement	7.07	Strong	7.57	Strong	0.51
Personal priorities and need for safety	7.68	Strong	8.88	Excellent	1.20
Personal appreciation of risk	6.08	Average	5.54	Average	-0.54
Work environment	6.16	Strong	6.32	Strong	0.16

## 5.2 Graphical Results

The percentage of earplugs use continuously rose throughout the four periods, as shown in Figure 5, from only 8% in the first period until finally leveling off in the fourth period at 67%. Such percentage fully support the experimental objective as originally stated; to eliminate unsafe behaviour of worker in Indonesian industry through increasing their safety culture and awareness regarding of hearing loss. The sustained effect of the present-bias preference nudge, which states, 'quick gain beats long term effect' and may be interpreted at two levels:

1. The apparent success that the immediate feedback has evoking sufficient motivation at the individual and population worker level to overcome usual resistance to wearing the earplugs and effecting the desired behaviour change. Since the worker are rewarded and not forced to do so, presumably a worker's continued use of earplugs would become reinforced by the consequent noise reduction and relief that the users would then experience.
2. The use of earplugs by large number of workers at PT. Sunter Inti Megah creates new norms and behaviour standards to be more aware in safety issues.

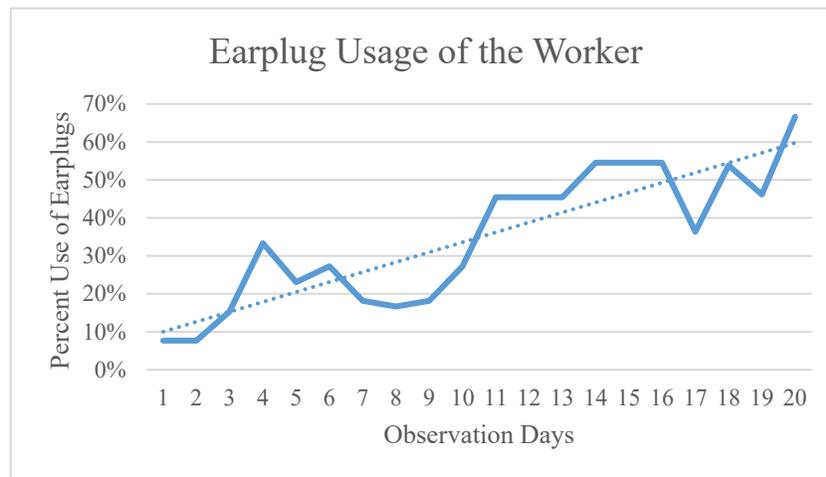


Figure 5. Percentage of earplugs usage at PT. Sunter Inti Megah

Another finding of this research is that the feedback procedure directly applied the all of the workers. It can be conducted over a determined time to affect the desired result in all of the employees, even the management level. Once this occurs, the nudge effect can be sustained through the newly established safety awareness level and norms for accepted work behaviours.

## 5.3 Proposed Improvements

### 1. Maintaining Safety Climate

New challenge emerged as we finished implementing the nudge for a period of one month. Ideally, nudge should be implemented for at least five months to follow up the newly established safety awareness level and norms for accepted work behaviours. This lengthy follow up period is intended to reflect a possible long-term behavioural change and impact the nudge sustainability. It is assumed that workers willingness to use earplugs on a regular basis for several months will probably continue to use them for as long as they stay in a noisy job environment, supported also by the bulletin board not taken-off to continuously remind them.

Due to the limited time of this research, a mitigation has been made to maintain the newly established safety climate at PT. Sunter Inti Megah. Since the management will not force the worker to wear any kind of personal protective equipment, instead the management believe that nudge is still the most effective solution again to be implemented for the company's future. Hence, the researcher has developed several solutions to hand over the progress to the management at PT. Sunter Inti Megah.

### 2. The Application of Nudge Theory

Controlling exposures to occupational hazards will be the fundamental method of protecting workers at the company and has been used widely. The hierarchy of control is used to determine how to implement feasible and effective control solutions. The hierarchy of control consists of five different levels, which are elimination as the most effective

solution, followed by substitution, engineering controls, administrative controls, and personal protective equipment (PPE) as the last effective solution.

The nudge implementation aims for changing the worker's behaviour towards safety to reduce unsafe behaviour. Through daily hearing check in every worker, automatically nudge can be categorized as administrative controls in the hierarchy by changing the way people work. Administrative controls is frequently used with existing processes where hazards are not particularly well controlled, such as hearing risk where the outcome is delayed and appeared after long duration exposure.

The workers at PT. Sunter Inti Megah are now more aware than ever that they need to pay attention more to their hearing risk. This achievement was realized through their hearing check results that was posted in the bulletin board, where they can clearly see the difference between worker wearing earplugs on testing day, worker not wearing earplugs on testing day, and veteran worker whom never wear earplugs while working. These findings were followed by some explanation by the researcher of what should be done to counter the problem, which is to wear earplugs. The number of earplugs usage becomes the indicator whether the nudge effectively eliminate unsafe behaviour or not. As the percentage of earplugs usage increased in this study, it become clear that nudge has successfully change the way people work through administrative controls.

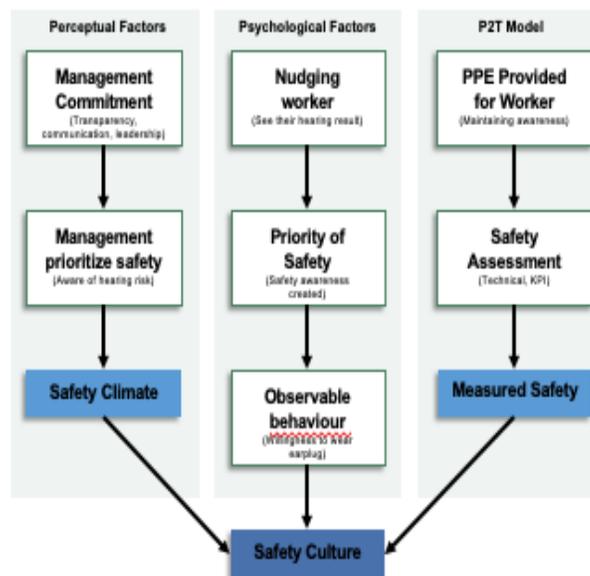


Figure 6. Safety culture generated

The primary advantage when using nudge is because it is based on convincing and free will instead of rules and instructions (no mandates), as potentially all nudge types can be used for safety application in the future. However, when we decided to choose the present bias preference nudge, it will develop some kind of characteristics for the nudge; help behave when indifferent, open conscious thinking, self-chosen, and start or increase a behaviour.

The nudge is in the form of daily hearing check of the workers before and after work shift as previously mentioned. The main tools of the nudge is the bulletin board that is placed in the worker's break room, so the worker can compare similar audiometric results for other users and non-users of the earplugs that were posted each day on the bulletin board. From the beginning until the end of the experiment, workers are more and more care about their hearing risk and willing more to wear earplugs while working. The result creates new norms and behaviour standards for the workers at PT. Sunter Inti Megah to be more aware in safety issues, as illustrated in Figure 6.

## 6. Conclusion

After one month of implementation on daily hearing check, the LSCAT scored raised 0.41 from 6.98 before nudge implementation to 7.38 after nudge implementation and can be flagged as strong on safety value. The data clarifies

that the nudge obviously raise the worker's safety culture and awareness, especially regarding their hearing risk. The researcher can conclude that the workers need is the management attention and caring to them to provide personal protective equipment such as earplug, mask, protective shoes, etc.

There are significant differences between the hearing levels threshold that were observed before work shift and at the end of the work shift on the worker who used the earplugs on the test day and the worker who did not used the earplugs on test day. The evident also marked that the veteran worker who never used earplugs while working suffered permanent hearing loss.

The percentage of earplugs use continuously rose throughout the experiment, from only 8% in the first period until finally leveling off in the fourth period at 67%. The prove of apparent success that the immediate feedback (present-bias preference nudge) has evoking sufficient motivation at the individual and population worker level at the company to overcome usual resistance to wearing the earplugs and effecting the desired behaviour change although some of them have been working for more than 10 years. Since the worker are rewarded and not forced to do so, we can assume that the worker's continued routine to use of earplugs would become reinforced by the consequent noise reduction and relief that the users would then experience.

The use of earplugs by large number of workers at PT. Sunter Inti Megah creates new norms and behaviour standards to be more aware in safety issues. The management believes that nudge is still the most effective solution again to be implemented for the company's future and they will continue to follow-up the nudge to be implemented for their workers.

The workers at PT. Sunter Inti Megah are now more aware than ever that they need to pay attention more to their hearing risk. The number of earplugs usage becomes the indicator whether the nudge effectively eliminate unsafe behaviour or not. As the percentage of earplugs usage increased in this study, it become clear that nudge has successfully change the way people work through administrative controls.

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## Biographies

**Andri Prabowo** is a final year student in Department of Industrial Engineering from Universitas Indonesia. He was appointed as the Head Coordinator of Ergonomics Centre Laboratory University of Indonesia and actively involved as the Head of People Affairs in Institute of Industrial and System Engineers (IISE UT). He also volunteered working as a Project Specialist for consulting project in creating marketing strategy and currently has the opportunity to work as a Product Analyst in one of the biggest Online Travel Agency (OTA) in Indonesia.

**Danu Hadi Syaifullah** is a teaching staff at Ergonomics Centre Laboratory in Department of Industrial Engineering, University of Indonesia. He holds a Bachelor of Engineering degree from Institut Teknologi Bandung (ITB), Indonesia and a Master of Science degree in Safety Science from University of New South Wales (UNSW), Australia. He is currently doing a PhD at Coventry University, England, in the Centre of Business in Society (CBiS).