

# IMPLEMENTING SAFE WORKING CYCLE (SWC) CONCEPT AMIDST THE COVID-19 CRISIS IN SRI LANKA

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## ABSTRACT

*The phenomenon of COVID-19 has introduced critical challenges in the architecture, engineering, and the entire construction industry. A safe Working Cycle is a Japanese concept. It incorporates to enhance the effective implementation of safety management systems, thereby helping to prevent health and safety issues. This research mainly aims at identifying the strategies for overcoming barriers to implementing the Safe Working Cycle (SWC) concept during the COVID-19 pandemics in Sri Lanka. The research study focused more on reducing health-related illnesses caused by COVID-19 than on the other physical safety issues at the construction site. In such a critical health issue, the protection of human resources, an essential part of the construction industry, should be prioritized. The aim of the Study was reached through the sequential mixed method. The semi-structured expert interviews were initially conducted, and after that questionnaire survey was achieved among health and safety officers in construction projects in Sri Lanka. In the semi-structured interviews, data were analyzed using Nvivo thematic analysis software and questionnaire survey; M.S. Excel analyzed the collected data. Following the findings, several potential barriers were arisen to implementing the SWC concept in the Sri Lankan construction industry: including limited Budget allocation, poor safety attitude, limited land space, strict project schedules, and unawareness of workers. Further, this Study also indicated several potential practical strategies to overcome these barriers identified for SWC implementation. Such as; Implementing the COVID-19 bio bubble concept, Organizing regular toolbox meetings, demonstrating sign boards specific to this new concept, arranging separate systematic time slots, build-up a good communication network. The safe Working Cycle (SWC) is not currently practised in Sri Lankan construction culture. However, health and safety professionals are familiar with almost every aspect of the Safe Working Cycle (SWC); therefore, it is possible to put this into practice in the Sri Lankan construction industry.*

**Keywords:** Construction Safety; COVID-19; Safety Barriers; Safe Working Cycle; Strategies.

## 1. INTRODUCTION

Global Pandemic situations are not a new phenomenon. Regional and global pandemic situations have occurred at various times throughout history. In the last century, the world faced various pandemics, such as SARS in 2002, Swine flu in 2009, and Ebola in 2014. The impact of large-scale pandemics is high and spreads rapidly, regionally and globally

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(Jordà, et al., 2020 and Stephany, et al., 2020). Today, the world is facing a critical pandemic situation. It is the COVID-19 virus that is rapidly spreading and is currently a major global issue. (WHO, 2021). These conditions have a massive effect on the social and economic sector of Sri Lanka. It is a significantly uncertain situation. In Sri Lanka and the world industry culture, the health and safety hazards of the construction industry are high compared to other sectors (Rameezdeen, et al., 2006). According to Nawi, et al. (2016), there is a considerable requirement for health and safety in the construction industry. The main reason for this is that direct human resource involvement is relatively high. They recommended that the best solution establish a proper health and safety management system. It is crucial during this critical time if the construction industry is to survive a deadly virus such as COVID-19.

Chan and Choi (2015) further emphasized that an effective way to do this is to implement the concept of a Safe Working Cycle (SWC) in the construction industry. Chan and Hung (2013) indicated that the Safe Working Cycle concept (SWC) is a methodology introduced in Japan to regulate the daily working process related to health and safety. This research has based on current pandemic health issues in Sri Lanka. Although the Safe Working and safety in the Sri Lankan construction industry (Mendis, et al., 2017). Therefore, Darshana (2017) identified that the traditional safety management systems followed in the Sri Lankan context have not been very successful in satisfying the construction industry's fundamental health and safety requirements, modifying existing tools, and applying a new safety management tool. In this critical pandemic situation, SWC could be extraordinarily prudent in mitigating the prevailing unsafe working environment in the Sri Lankan construction industry. Therefore, this research investigates the practical strategies to overcome barriers to implementing the Safe Working Cycle (SWC) concept during the COVID-19 pandemic in Sri Lanka.

## **2. IMPACT OF A COVID-19 PANDEMIC ON HEALTH ASPECTS IN THE CONSTRUCTION INDUSTRY**

Human activities related to the construction industry have been limited for a short time due to the incredible speed of the COVID-19 virus (Congressional Research Service, 2021). This COVID-19 health issue has affected the current economy of Sri Lanka. Sri Lanka's current economy is mainly dependent on exports, tourism, foreign employment, and the industrial sector. Annual Report (2020) in Sri Lanka further highlighted the GDP contribution of the industrial sector, which is a major sector, shows a decline in 2020 compared to 2019. In 2019-26.4% and 2020-25.5%.

The construction industry in Sri Lanka has to face many risks due to the COVID-19 pandemic situation. Further, Vithana, et al. (2020) illustrated that this pandemic situation had caused many health issues in the construction industry, posing huge economic barriers and risks. Such as damage to existing building raw materials, labour shortage, delays in payments by clients, rental cost for office buildings and hired equipment, plants, and machinery, risk of bankruptcy, and risk of termination of projects. Economic impacts and health-related impacts are also interconnected in the whole industry culture. According to the Congressional Research Service, 2021, due to the increase in human activities and the inevitable need for a workforce compared to other industries, the health problems caused by this COVID-19 pandemic have a significant impact on the overall construction project performance. Many countries, including Britain, are currently

allocating extra money to control the COVID-19 pandemic in the construction industry. The labour force must be reduced in Sri Lanka and other parts of the world due to the health guidelines controlling COVID-19 (Wimalaweera, 2020).

Bloom et al. (2005) stated that as the construction industry deals mainly with foreign investment, the pandemic will severely impact construction projects' overall economy and future investment. For example, according to Harinarain and Haupt (2014), while the construction industry in South Africa was at risk of spreading AIDS and HIV, its employees were at a higher risk of Infecting the diseases. Further, they added that the ever-changing workforce was a significant factor in spreading the disease. In such a critical health or safety issue, the protection of human resources, an essential part of the construction industry, should be prioritized. Chan and Choi (2015) further emphasized that an effective way to do this is to implement the concept of a Safe Working Cycle (SWC) in the construction industry.

### 3. IMPLEMENTATION OF THE SAFE WORKING CYCLE (SWC) CONCEPT

The Real Estate Developers Association of Hong Kong and The Hong Kong Construction Association (2005) also identified that Safe Working Cycle (SWC) Concept is the most effective and convenient way to promote construction health and safety. Chan and Hung (2013) indicated that the main objective of the Safe Working Cycle concept is to improve construction safety and health culture. Further, create a conducive environment for working employees. The SWC concept was first introduced to Japan in 1982 by the Japan construction safety and health association for construction companies. This concept has been practically implemented in Japan for over 20 years (Environment Transport and Works Bureau, 2002). The Safe Working Cycle is a well-planned, scheduled event program with specific targets/goals set daily, weekly, or monthly (Occupational Safety and Health Council Hong Kong, China., 2002). They further emphasized that implementing this concept ensures that the construction site is safe and hygienic. The process is repeated daily with the awareness of the construction workers for both health and safety practices (Figure 1).



Figure 1: The daily SWC

Sources: Chan and Choi (2015); Occupational Safety and Health Council Hong Kong (2002); Lam, H. (2000)

Ozaka (2000) indicated that another goal of implementing the SWC concept is to increase cooperation in security activities between contractors and subcontractors, build mutual trust between supervisors and construction workers, and encourage proper communication skills. Further Occupational Safety and Health Council of Hong Kong, China (2002) stated that this concept trains construction workers to recognize, accept, and execute safety messages. In addition, it ultimately transforms the construction environment into a systematic proper safety culture.

The SWC concept is primarily a tool for ensuring the health and safety of the industry, which is mainly subject to systematic inspections, and oversight and supports the implementation of frequent safety committee meetings (Lam. H, 2000). According to Occupational Safety and Health Council Hong Kong, China (2002), implementing a management system with health and safety policies could change the management of traditional companies and minimize overall safety issues and other related issues. The SWC concept can be implemented in any problematic situation, and by putting it into practice, significant progress has been made in the safety and health aspects of construction projects. It also significantly reduces the number of accidents (Occupational Safety and Health Council Hong Kong, China, 2002). Further, they illustrated that in the current world, China, Hong Kong, Singapore, the United Kingdom, and Japan are increasingly adopting the Safe Working Cycle concept in their construction projects. The United Kingdom and Hong Kong governments make significant contributions to implementing the SWC concept. Thus, passing on this new knowledge to construction workers, even books also have been published.

Implementing the Safe Working Cycle concept in the construction industry benefits the client and the contractor (Choi, et al., 2011). In addition, they emphasized that the SWC concept is an effective tool to improve the safety of the entire construction industry by allowing contractors to carry out construction work safely and without any hindrance. Chan and Choi (2015) reported that implementing the SWC concept in construction projects will benefit the entire construction project and its employees. Such as having a better understanding of site conditions and daily activities, facilitating safety-related communication between site management staff members and construction workers, making every construction worker better aware of safety, improving the safety practices of construction workers, to minimize the cost of health and safety, introduce a better site safety system and take steps to prevent an accident before it occurs, promote the reputation and image of the construction company or organization involved in the project. In addition to the above, a few benefits have been identified and included in this literature. Reducing the accident rate on the construction site, improving safety communications (Occupational Safety and Health Council Hong Kong, China., 2002), and improving health and safety-related training (Chan, et al., 2005). Strengthen the safety awareness of the construction site and create a hygienic environment in any problematic situation quickly (Tse S.L, 2005).

Mendis, et al. (2017) indicated that one could create a safe working environment by incorporating the concept of the Safe Working Cycle in the construction culture of Sri Lanka. They also elaborated that implementing this Safe Working Cycle concept in all construction industries globally, including Sri Lanka, can bring many benefits in terms of health and safety. Thus, attention should be paid to the barriers to implementing this concept and related health and safety issues. It was, therefore, emphasized that the implementation of this concept would go a long way in reducing mortality and hazard

rates. According to (Mendis, et al., 2016:2017), although the concept of the Safe Working Cycle is not very popular in Sri Lanka, it has been pointed out can gain many opportunities by implementing this concept in practice in the construction industry in Sri Lanka. Further, they also stated that many foreign investment projects are currently being implemented in Sri Lanka. This expert knowledge could also help to promote this concept in the construction culture of Sri Lanka.

### **3.1 BARRIERS TO IMPLEMENTING SWC**

Chan and Hung (2013) indicated that the Hong Kong construction industry had faced various barriers and risks in implementing the concept of a Safe Working Cycle. The construction industry in Sri Lanka also faced various barriers and risks in establishing a new safety management system (Darshana, 2017). They further emphasized that various barriers and risks are involved in establishing a new health and safety management concept in Sri Lanka. Due to the traditional safety management techniques currently available in the construction industry in Sri Lanka, many people in the construction industry are reluctant to adopt a new concept.

Mendis, et al. (2016:2017) highlighted that the main barrier to implementing the safe working cycle concept in the construction industry is the tight work schedule on the site. In addition, they also indicated that there are significant barriers to the implementation of the safe working cycle concept in the construction industry in Sri Lanka. Such as low literacy level of site workers, poor health and safety attitude of site workers, Inadequate health and safety attitude of top managers, poor participation in SWC activities, less awareness of the SWC concept, and budget allocation issues. Mendis, et al. (2017) also emphasized that the need and suitability of implementing the Safe Working Cycle concept in the construction industry in Sri Lanka are very high. Further, they indicated that this safety management concept would significantly improve individual safety behaviour and would potentially gain Sri Lanka's safety construction culture to an adequate level. According to (Choi, et al., 2012), there are three main categories of common barriers to implementing a new safety management system on construction sites. Such as challenges related to workers, challenges related to contractors, and problems related to the practices of subcontractors.

Given the cited above, the concept of a Safe Working Cycle (SWC) is an essential tool that provides several benefits to the health and safety sectors of the construction industry. Due to the current pandemic of COVID-19 in the construction industry and around the world, the implementation of the SWC concept in the construction industry is a timely necessity. This research focused more on reducing health-related illnesses caused by COVID-19 than on the other physical safety issues at the construction site. As mentioned in section 1, statistics on accidents and health-related illnesses describe the construction industry in Sri Lanka as a vital sector that needs to be overhauled in the current health and safety management system. Furthermore, the need for this health and safety management system is well illustrated by the impact of the current COVID-19 pandemic on the construction industry, as described in section 2. The construction industry in Sri Lanka can move forward without any interruption if proper attention is paid to the new barriers and inherited barriers in implementing this concept during the current pandemic season. Therefore, this research aimed to Identify the practical strategies to overcome barriers to implementing this Safe Working Cycle concept during the COVID-19

pandemic in Sri Lanka. In literature review did not find significant new barriers and strategies based on this research aim.

#### **4. RESEARCH METHODOLOGY**

The aim of the Study was reached through the sequential mixed method. According to Creswell (2009), both qualitative and quantitative forms have been included in mixed-method to enhance the overall research strength. The literature survey has identified several common barriers to implementing the safe working cycle (SWC) concept in the construction industry in Sri Lanka. These are common barriers that occur in a construction environment with normal conditions. (Before the COVID-19 pandemic situation). This research was studied related to the COVID-19 pandemic. It investigated barriers to implementing this safe working cycle concept during the pandemic and identified practical strategies to overcome those barriers. In the sequential mixed method, the semi-structured interviews were initially conducted, and after that questionnaire survey was achieved. Semi-structured interviews were conducted to collect necessary data with the support of five subject matter experts from the construction industry, health, and safety management position (more than ten years of experience). Phenomenology was used to capture the people who participated in this interview's professional experience, behaviour, and opinions. The semi-structured interviews were transcribed, and code-based thematic analysis was performed. The data collection was analyzed using the NVivo (Thematic analysis software) and included encrypting all data before identifying and reviewing two major themes (barriers and strategies). The questionnaire survey aimed to identify the significant barriers and strategies (determine the priority) of the safe working cycle concept during the COVID-19 pandemic in Sri Lanka. The barriers and strategies identified in the semi-structured interview were classified according to a priority sequence. This survey aims to increase the accuracy of the data collected.

The questionnaire survey was conducted with thirty (30) numbers of health and safety officers. Participants in the questionnaire survey were selected subject to the following criteria: These thirty (30) numbers of safety officers should be engaged in projects carried out by contractors with a grade of C1 or higher for building construction. C1 is a classification of contractors in the Sri Lankan context by the construction industry development authority (CIDA) of Sri Lanka. All major contractors in Srilanka belong to categories C1 and above). Respondents filled the google form with great interest in understanding the Safe Working Cycle (SWC) and achieved a 77% response rate. The survey consisted mainly of 10 questions measured on a 5-points Likert scale. The Likert scale of 1 to 5 was used in the data collection. Where 5 indicates a very high level of priority and 1 indicates a very low level of priority.

Furthermore, four multiple-choice questions also consisted in this survey. In the questionnaire survey, collected data were analyzed using percentage statistics for each barrier and strategy. The collected data were systematically processed before analysis. Data analysis was done by using M.S. Excel.

#### **5. FINDINGS OF SEMI-STRUCTURED INTERVIEWS**

Semi-structured interviews were conducted to identify the barriers to implementing the Safe Working Cycle concept during the COVID-19 pandemics in Sri Lanka and the strategies to overcome these barriers. As shown in Table 1, five experts from the

management positions were selected for expert interviews based on their knowledge and experience in the relevant field of construction health and safety.

All the respondents who participated in these semi-structured interviews had good knowledge and understanding of the SWC concept. Some respondents have gained knowledge and experience of the SWC concept through their specialized foreign projects (e.g., the Port city project). Some of the respondents were persons who had acquired knowledge and experience while employed abroad. (e.g., gulf countries Oman, Qatar, Japan, Singapore, China, etc.). Further, training workshops and CPD sessions have helped some respondents understand the SWC concept. It was revealed in this interview that many respondents have heard of this concept as a Site Safe Cycle. All respondents indicated that this SWC concept is not currently practised in the construction industry in Sri Lanka. However, they emphasized that some practices related to the SWC concept were still in use. All the respondents pointed out that the SWC concept is a timely necessity to minimize the impact of the construction industry in Sri Lanka during this COVID-19 period.

Table 1: Details of Respondents

Respondent	Designation	Years of experience in relevant field
A	Executive Health, Safety and Environment	16 years
B	Health, Safety, and Environment (HSE) Manager	12 years
C	Health, Safety, and Environment (HSE) Manager	20 years
D	Health and Safety Engineer	15 years
E	Health, Safety, and Environment (HSE) Assistant Manager	10 years

## 5.1 BARRIERS TO IMPLEMENTING SWC

This research is based on a new concept. General barriers also will be created when implementing a new concept in Sri Lanka. That is a typical situation in every country. These general barriers were identified through a literature survey and semi-structured interviews. In addition, based on expert interviews, several new barriers caused by COVID-19 were added to this Study. The identified barriers are listed in Table 2.

All respondents highlighted that lack of health and safety budget allocation is a major barrier to implementing the Safe working cycle concept (SWC). Proper budget allocation is a significant factor in the success of a construction project. All processes in the construction industry depend on the budget. So, all parties involved are concerned with cost reduction and profit maximization. Therefore, focus mainly on profit and not on health and safety practices. Respondent B further stated that the contractor would discontinue the health and safety activities due to the target profit at the initial stage. All respondents believed that important functions of SWC may not be functional to save time and money. They cited the current economic crisis caused by COVID-19 as the main reason for this. Respondents A and C mentioned that the strict project/work schedule is another major barrier to implementing the SWC concept. A tight work schedule in a construction project is caused by the need for the contractor to deliver the project to the client within the agreed time frame. Further, to avoid paying for additional costs due to unforeseen delays. Therefore, the respondents pointed out that regular toolbox meetings,

health and safety workshops, and inspections are often not carried out due to these strict schedules.

Table 2: Reexplored barriers and strategies on SWC implementation

Barriers	Strategies
Limited Budget allocation	Implement the COVID-19 bio bubble concept
Lack of officers with good knowledge and experience	Organize regular toolbox meetings.
Limited land space.	Demonstrate sign boards specific to this new concept.
Strict project schedules	Organize workshop series on this new concept.
Increased contact with the external environment.	Manage manpower properly.
Poor safety attitude and low literacy level of workers	Monitor 100% on how this new concept will work.
Unawareness of workers	Assign appropriate responsibility to sub-contractors. Arrange separate systematic time slots.
Labour shortage.	
Lack of interest in the new concept from top managers.	Buildup a good communication network.
Poor subcontracting habits.	

Respondents A, C, D, and E stressed that the unawareness, low literacy level, and poor health and safety attitude of Sri Lankan workers are the main reasons for these barriers to implementing a new concept. They indicated that non-attendance at health and safety meetings also affected limited access to the opportunity to obtain health and safety knowledge. Respondent C highlighted that the limited land or site space could be a significant challenge to the practical implementation of the SWC concept. He also indicated that required a considerable area to do regular toolbox meetings, health and physical exercise before work in the morning, and all site staff accommodation purposes. All respondents emphasized that due to the COVID-19 pandemic situation, all site staff officers and workers should pay special attention to accommodation. Respondents A and E further stated that due to the limited construction land area. Working in urban areas, including Colombo, could be a significant challenge.

Moreover, respondent D indicated that different work schedules affect another barrier to implementing the SWC concept. Such as, many employees work without proper time management. This barrier also could disturb the smooth operation of the SWC concept. Further, respondents A and C believed that the lack of experienced officers in the construction industry in Sri Lanka was a barrier to implementing a new concept such as SWC. Respondent E further mentioned that poor subcontractors' habits and a labour shortage are significant barriers to implementing the SWC concept. He also pointed out that the lack of human resources due to the COVID-19 pandemic was a major barrier. Although the Sri Lankan construction community is not much aware of this SWC concept, all experts mentioned that. However, health and safety professionals are familiar with almost every aspect of SWC; therefore, it is possible to put this into practice in the Sri Lankan construction industry by providing basic training on the concept.



## **5.2 STRATEGIES FOR IMPLEMENTING SWC**

This research study aimed to identify the practical strategies to overcome barriers for SWC during the COVID-19 pandemic in Sri Lanka. Based on an expert survey, all the strategies added to the above list are indicated in Table 4.2. All these strategies are based on the current COVID-19 pandemic-related strategies and general strategies (General strategies used to overcome the barriers when implementing a new concept in a normal situation.) All respondents stated that organizing regular toolbox meetings is an important strategy for maintaining a good health and safety culture. They point out that this regular toolbox meeting can raise health and safety awareness, which is also important for improving workers' and staff members' attitudes and literacy levels. Respondent B strongly believed that the bio-bubble concept was currently used in many industries; they indicated this strategy should also be suitable for implementation on the construction site. All respondents emphasized that this important strategic reason would help protect the human resource in this pandemic situation. They highlighted that this strategy is vital in implementing this new concept during this critical situation.

Interviewees C, D, and E indicated that demonstrating sign boards specific to this new concept is an essential strategy for the construction site at the initial stage. They believed that the display of these signboards on the construction site could raise the awareness of the workers to a very high level. Respondents A and C mentioned that Organize workshop series on this new concept for staff members such as; supervisors, technician officers, managers, etc. They indicated that this strategy is also important to better understand this new concept and easily pass that knowledge on to workers. Moreover, respondent D indicated that the manage manpower properly is another strategy to overcome those barriers. Further, as all experts mentioned, arranging separate systematic time slots is an important strategy for implementing new concepts. And respondent B emphasized that this new concept could be easily implemented by building a systematic communication network between everyone on the construction site. In addition, he also indicated that assigning appropriate responsibility for sub-contractors is one of the strategies to implement this new concept. However, all respondents mentioned that even in pandemic situations like COVID-19, the barriers to implementing a new concept (SWC) could be overcome using the strategies discussed above. The respondents agreed that the Safe Working Cycle (SWC) concept is functionally important and appropriate for the Sri Lankan context. All experts emphasized that as many foreign investment projects are being implemented in Srilanka today, all those involved in the construction industry will gain more knowledge and experience on the SWC concept. It has the potential reason to promote this concept in Srilanka. Furthermore, they emphasized that the SWC concept is a timely necessity factor due to the current COVID-19 pandemic.

## **6. FINDINGS OF QUESTIONNAIRE SURVEY**

The questionnaire survey aimed to identify the significant barriers and strategies (determine the priority) of the Safe Working Cycle concept during the COVID-19 pandemic in Srilanka. The barriers and strategies identified in the semi-structured interview were classified according to a priority sequence (refer Tables 3 and 4). This survey aimed to increase the accuracy of the data collected.

The questionnaire survey was conducted by thirty (30) numbers of safety officers. These thirty (30) numbers of safety officers should be engaged in projects carried out by

contractors with a grade of C1 or higher for building construction. Participants in the questionnaire survey were selected subject to the following unique criterion.

(C1 is a classification of contractors in the Sri Lankan context by the construction industry development authority (CIDA) of Sri Lanka. All major contractors in Sri Lanka belong to categories C1 and above)

Table 3. Priority sequence of particular barriers

	Percentage					Total
	Very low level priority	Low level priority	Medium level priority	High level priority	Extremely high level priority	
Limited Budget allocation	0%	0%	13%	30%	57%	100%
Lack of officers with good knowledge and experience	0%	3%	27%	53%	17%	100%
Limited land space.	7%	10%	17%	20%	43%	100%
Strict project schedules	0%	0%	7%	40%	53%	100%
Increased contact with the external environment.	60%	23%	17%	0%	0%	100%
Unawareness of workers	3%	10%	33%	23%	30%	100%
Labour shortage.	27%	30%	43%	3%	0%	100%
Lack of interest in the new concept from top managers.	13%	37%	50%	3%	0%	100%
Poor subcontracting habits.	20%	57%	23%	0%	0%	100%

The majority of those involved in the questionnaire survey identified limited budget allocation as the most priority barrier; 57% of participants have identified it as an extremely high-level priority. In addition, the respondents have identified two key priority barriers. 53% of participants identified strict project schedules as an extremely high-level priority, and participants also were identified limited land spaces as another major barrier. Participants identified that a lack of officers with good knowledge and experience was not an influential priority factor. They identified it as a high-level priority in the construction culture of Sri Lanka. All participants mentioned that unawareness of workers, the labour shortage, and lack of interest in the new concept from top managers was identified as related to the medium-level priority. In addition, increased contact with the external environment and poor subcontracting habits were identified under low-level priority.

The majority of those involved in the questionnaire survey identified organizing regular toolbox meetings as the most priority strategy; 60% of participants identified it as an extremely high-level priority. In addition, the respondents have identified two key priority strategies. Demonstrate sign boards specific to this new concept identified 43% of

participants as an extremely high-level priority. Participants were identified to implement the COVID-19 bio bubble concept as another major strategy. This strategy also identified the timely necessity factors.

Table 4. Priority sequence of particular strategies

	Percentage					Total
	Very low -level priority	Low- level priority	Medium- level priority	High- level priority	Extremely high-level priority	
Implement the COVID-19 bio bubble concept	0%	10%	30%	43%	17%	100%
Organize regular toolbox meetings	0%	0%	17%	23%	60%	100%
Demonstrate sign boards specific to this new concept	0%	3%	23%	30%	43%	100%
Organize workshop series on this new concept	3%	13%	47%	30%	7%	100%
Manage manpower properly	0%	27%	57%	17%	0%	100%
Monitor 100% on how this new concept will work	7%	53%	17%	13%	10%	100%
Assign appropriate responsibility for sub-contractors	30%	50%	20%	0%	0%	100%
Arrange separate systematic time slots	0%	10%	63%	20%	7%	100%

All participants mentioned that organizing workshop series on this new concept, managing manpower properly, and arranging separate systematic time slot; these strategies were identified as related to the medium level priority. In addition, assign appropriate responsibility for sub-contractors and Monitor 100% how this new concept will work; these strategies were identified under low-level priority.

The majority of those who participated in the questionnaire survey also expressly responded that this SWC concept is important and needs to be implemented at this critical moment.

## 7. CONCLUSION

The research study mainly aimed at identifying the strategies to overcome barriers for implementing the Safe Working Cycle (SWC) concept during the COVID-19 pandemic in Sri Lanka. The Safe Working Cycle concept (SWC) is a construction site health and safety management tool. Today, the world is facing a terrible pandemic situation. It is the COVID-19 virus that is rapidly spreading and is currently a major global issue. The research focused more on reducing health-related illnesses caused by COVID-19 than on the physical safety issues at the construction site. The current situation in the world is that health needs are more important than the economy. In such a critical health issue, the protection of human resources, an essential part of the construction industry, should be

prioritized. The research emphasized that the SWC is not currently practised in Sri Lankan construction culture. However, health and safety professionals are familiar with almost every aspect of SWC; therefore, it is possible to put this into practice in the Sri Lankan construction industry by providing basic training on the concept.

The literature survey finds that the construction community in Sri Lanka can gain many benefits from implementing the SWC concept. Such as reducing the accident rate on the construction site, improving safety communications, strengthening the safety awareness of the construction site, creating a hygienic environment in any problematic situation, etc. However, findings from the expert interviews reveal several potential barriers to implementing the SWC concept in the Sri Lankan context. In addition, several new barriers caused by COVID-19 were added to this study, such as; limited budget allocation, poor safety attitude, the low literacy level of workers, lack of officers with good knowledge and experience, limited land space, strict project schedules, unawareness of workers, lack of interest in the new concept from top managers, Poor subcontracting habits, labour shortage. Further, this research study included several potential practical strategies to overcome barriers to the SWC concept in the Sri Lankan context. These strategies are based on the current COVID-19 pandemic-related and general strategies. Such as; implementing the COVID-19 bio bubble concept, organizing regular toolbox meetings, demonstrating sign boards specific to this new concept, managing manpower properly, arranging a separate systematic time slot, building up a good communication network, and assigning appropriate responsibility for sub-contractors.

This research study reveals that effective implementation of the Safe Working Cycle (SWC) concept during the current pandemic period can enhance the health and safety behaviours of the people involved in construction projects, thereby building a better health and safety Culture. All expert interview respondents agreed that the Safe Working Cycle (SWC) concept is functionally essential and appropriate for the Sri Lankan context. Furthermore, they also emphasized that the SWC concept is a timely necessity factor due to the current COVID-19 pandemic.

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