

# Factors Affecting Flight Attendants' Performance While Performing Safety Emergency Procedures and Wearing Personal Protective Equipment (PPE) During the COVID-19 Pandemic

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## Abstract

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The purpose of this research was to study the factors affecting the performance of safety during an emergency of flight attendants from wearing personal protective equipment (PPE: Personal Protective Equipment) during the epidemic. The coronavirus disease 2019 was studied by factors including Problems encountered by wearing personal protective equipment How does wearing personal protective equipment affect performance in the event of various types of emergencies? Corporate safety policies related to the wearing of personal protective equipment affect flight attendants' performance of emergency safety precautions. by group discussion (Focus Group) and questionnaires via online questionnaires when analyzed with statistical tools It was found that the factors affecting the performance of duty in taking care of the safety of flight attendants consisted of: and types of personal protective equipment including the safety policy of the organization, both in the airline sector and organizations that issue guidelines This is because the use of personal protective equipment by flight attendants is not only concerned with preventing the spread of the novel coronavirus disease 2019 but also taking into account their use while performing their safety duties together.

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**Keywords:** Personal protective equipment, flight attendants, emergency security duties, Focus group

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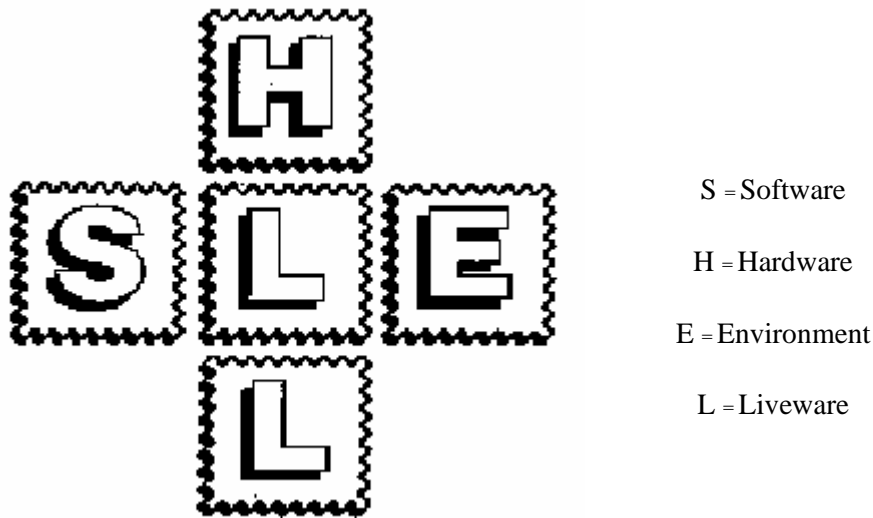
## Introduction

From the guidelines of passengers on aircraft traveling on domestic flights during the coronavirus disease 2019 outbreak, according to the Civil Aviation Authority of Thailand announcement, flight attendants are required to wear personal protective equipment. It is a mask and gloves to perform duties on flights or wear personal protective equipment. other additional according to the policy of the airline ( Guidelines for servicing passengers on domestic routes during the Coronavirus Disease 2019 (COVID-19) outbreak situation, 2020). Airlines have issued a policy following the provision of flight attendants to wear basic personal protective equipment under the guidelines, and some airlines have added personal protective equipment. Others such as Face shields, Goggles, Gowns, Hood, PPE suits, and Shoe covers (Diagnostic Manual Coronavirus disease 2019, 2020) to comply with the requirements of the airport of the destination country where the flight takes place. including increasing safety and confidence for both flight attendants and passengers carrying out the duties of a flight attendant is not only taking care of the service. Observe and monitor the behavior of passengers under government measures. Both wearing masks maintain social distance and other things that must be done when traveling by plane to prevent the spread of the coronavirus disease 2019 (Guidelines for

servicing passengers on domestic routes during the Coronavirus Disease 2019 (COVID-19) outbreak situation, 2020)

Flight attendants have an important role to take care of the safety of passengers in normal situations. and emergencies such as fires on planes where flight attendants must extinguish fires (Fire Fighting) as quickly as possible following safety procedures Decompression and Emergency landing and evacuation as specified in the Flight Attendant Safety Training Manual. by the International Civil Aviation Organization (Cabin Crew Safety Training Manual, 2014) Flight attendants are obliged to follow safety and emergency procedures in the event of such an emergency, such as extinguishing fires, making announcements, and issuing commands to control it. Advising passengers to follow safety procedures and wearing an oxygen mask when there is a loss of air pressure in the cabin. must be as efficient as possible It takes the least amount of time to be able to take care of passengers. Flight attendants, pilots, and planes are trained to be as safe as possible. But in the safety procedures that have been trained, no personal protective equipment is worn. From the experience of the researcher who has served as a flight attendant safety training teacher and flight attendant manager, this raises the question of how the wearing of personal protective equipment affects flight attendant safety performance in the event of an emergency. and what factors affect safety

## The SHELL Model



**Figure 1** Interrelationship between human factors and the aviation environment

From studying the safety manual of flight attendants, related concepts and theories. The researcher, therefore, used the SHELL Model (SHELL Model, 2021), which is a model that shows the relationship between people (Liveware = the flight attendant) and the factors in the system that people have to enter. Interactions include tools, hardware, software, environment, and outside liveware.

Let's explain the guidelines for servicing passengers on domestic routes during the Coronavirus Disease 2019 outbreak situation as follows: In 2019 (Environment), the Department of Civil Aviation has issued a guideline that is consistent with the Ministry of Public Health (Software) policy. Liveware) Using the basic personal protective equipment is a mask. And gloves (Hardware) This practice can answer the question of preventing the spread, but in this

research, we will find out whether flight attendants can still perform safety functions in emergencies as effectively as before. or by doing a group conversation with the airline, both flight attendants Department managers and executives and the preparation of questionnaires to study factors affecting the performance of safety supervision in an emergency. of flight attendants from wearing personal protective equipment During the coronavirus disease 2019 epidemic, including the use of various personal protective equipment. To wear while working and perform duties following safety procedures when an emergency occurs ( Safety and Emergency Procedure) and organizational safety policies. whether it is to educate, public relations, Prepare personal protective equipment, and Appropriate theoretical and practical training. This is to determine the factors affecting flight



attendants' compliance with emergency safety precautions against wearing personal protective equipment. During the coronavirus disease 2019 outbreak, for the benefit of airlines and related agencies handling Prepare solutions and find the best solutions. This allows flight attendants to perform their duties to the fullest when wearing personal protective equipment.

safety duties in the event of an incident. emergency

2 . Emergency procedures if flight attendants wear personal protective equipment ( PPE) during an unclear coronavirus disease 2 0 1 9 aircraft epidemic. For the duty of flight attendants in the event of an emergency

### Research objectives

1 . To study the factors affecting the performance of duty in taking care of safety when there is an emergency of flight attendants from wearing personal protective equipment ( PPE: Personal Protective Equipment) during the epidemic of infectious diseases coronavirus 2019

2. To know about the problems caused by wearing personal protective equipment (PPE: Personal Protective Equipment) of flight attendants during the coronavirus disease 2019 epidemic on their duty of care. Safe in the event of an emergency

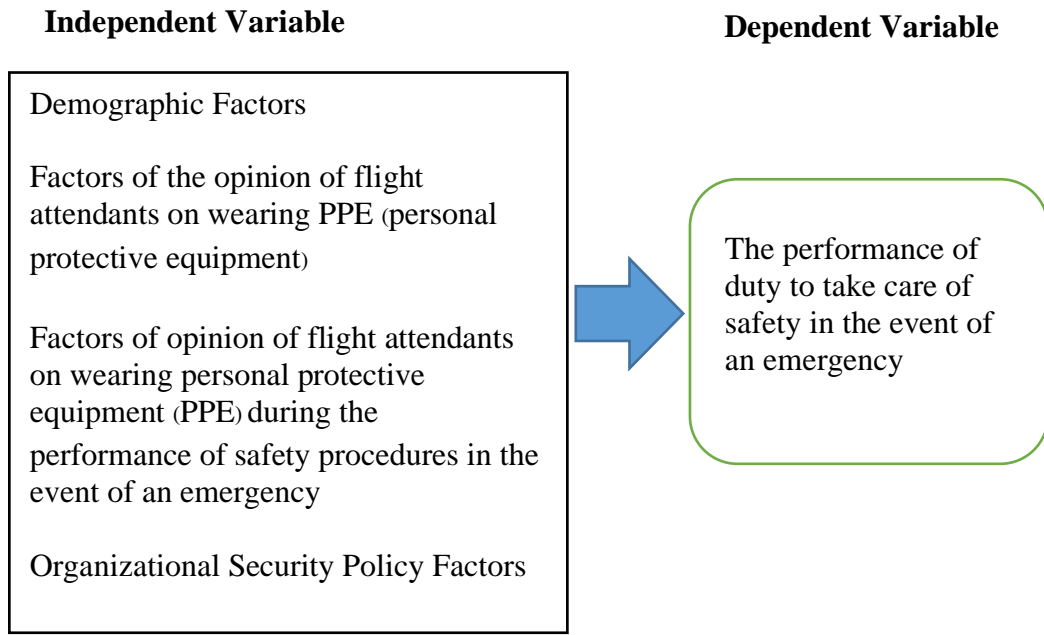
### Scope of research

This research is exploratory research from the focus group collected information to prepare the questionnaire ( Questionnaire) in an online form ( google form) and publish the questionnaire through various social media channels such as Facebook group, and Line application. To collect data from a sample group of flight attendants working with Thai airlines flying domestic flights and internationally, both taking care of the cabin in the passenger transport and transport During the epidemic of coronavirus disease 2 0 1 9 from October 2020 to October 2021, the factors included in the study consisted of 1. Demographic factors 2. Factors of the opinion of flight attendants on wearing PPE 3. Factors of the opinion of flight attendants on wearing PPE PPE while performing duties following safety procedures in the event of an emergency and 4 . Organizational safety policy factors

### Research hypothesis

1 . The wearing of personal protective equipment ( PPE) of flight attendants during the coronavirus disease 2 0 1 9 outbreak affects their ability to perform

## The research conceptual framework



**Figure 2** conceptual framework

## Research method

### Sample and population

The research population was flight attendants who fly domestic flights. And internationally, both taking care of the cabin in passenger transport and transport by During the coronavirus disease 2019 epidemic between October 2020 and October 2021, 91 samples were drawn.

Sample sizes were based on population comparisons from the Taro Yamane table at a population size of 1,000 (due to flight attendants' approximately 10–15 percent of the duties under the employee reduction policy). The voluntary policy to stop flying was implemented, and the number of flights was reduced by more than 80 percent. The confidence level was 90%, and the level of error was 5%, as determined by random sampling.



## **The research instruments**

The research tools were focus groups and questionnaires. The questionnaire collection consists of 5 parts, Part 1. Demographic factors. Part 2. Flight attendants' opinion factors on wearing PPE. Part 3. Flight attendants' opinion factors on wearing PPE. person PPE during the performance of safety procedures in the event of an emergency Part 4. Organizational Security Policy Factors Part 5 Suggestions by collecting data in an online form (google form) and disseminating the questionnaire through various social media channels such as Facebook groups and Line application.

## **Data analysis**

The quantitative data used descriptive statistics such as mean, frequency, and standard deviation. and using inferential statistics by comparing the mean Qualitative data by distraction from group discussions

## **Research results**

### **The result of the focus group**

The management informed that the issuance of passenger guidelines according to the Civil Aviation Authority of Thailand announcement Opinion users of the policy, that is, airlines, was not questioned at the meetings preceding the release of the guideline, were merely informative. In addition, the guidelines do not explicitly state the characteristics of personal protective equipment, requiring each airline to seek information and provide experts to explain the procedure for using and preparing personal protective equipment. epidemic prevention according to the standards of

the Ministry of Health and the requirements of the destination airport on the type of equipment mainly specified with the time constraints and limitations of personal protective equipment being produced, the use of flight attendants in safety has not been taken into account.

The flight attendants informed us that the airline had arranged a doctor. Knowledgeable speakers explain the procedure for inserting and removing standard personal protective equipment. Public relations information about the epidemic, self-care, and use of personal protective equipment is provided. Including adjusting the process of demonstrating the use of the device when there is an emergency in the use of oxygen masks by adding steps to remove the mask first. However, there is a lack of practical training in the use of personal protective equipment in emergencies.

### **Problems encountered in the use of personal protection**

Safety masks are more difficult to breathe compared to facial masks, especially when working on planes. Safety goggles and face shields affect the vision from the fog of such devices from breathing and speaking, when worn for a long time, causing headaches, and eyestrain. It is also inconvenient to communicate and make announcements on planes. Operation suits and gowns affect the movement of the body as a matter of agility and ventilation (Hot weather can cause fainting.). Foot protection affect movement slow down the movement because be careful of slippery in the performance of safety functions that must move quickly may cause accidents and affect the safety of performing duties following safety procedures.



## **The results of the questionnaire**

### **Factors of demographics**

The research consisted of a total of 91 people in this study. The majority of them were 66 females (72.5 percent), 23 males (26.1%), and 1 person who did not want to specify gender (100 percent). 1.4 each. The age range of most respondents was 31–35 years old, representing 36.2%, followed by the age range of 26–30 years, accounting for 29 percent. experience working as a flight attendant for the respondents. Most had more than 8 years' experience accounted for 43.5 percent, followed by 6-8 years of experience, accounting for 24.6%. The majority of respondents (47 percent) were flight attendants, followed by chief

flight attendants. 23 percent of respondents flew on international cargo flights, with 60 percent on cabin cargo, and 30 percent flew on domestic passenger flights. The vast majority of personal protective equipment (PPE) worn during airline policy duties during the coronavirus pandemic were gloves (98.8 percent), masks (97.1 percent), and goggles. Safety clothing made up 94.2%, operating jackets made up 79.7%, masks made up 75.4%, face shields made up 65.2 percent, foot protection equipment made up 62.3%, and operating clothes made up 10%. 39.1 (Since flight attendants must wear more than one piece of personal protective equipment, the minimum required by the Department of Civil Aviation and according to the policy of each airline) according to Table 1.

**Table 1** Shows the number and percentage of personal data collected.

Personal Factors Percentage		Number (n=91)	Percentage
<b>Sex</b>			
Male		23	26.1
Female		66	72.5
Not Specified		1	1.4
<b>Age</b>			
21 - 25		-	-
26 - 30		27	29
31 - 35		33	36.2
36 - 40		24	26.1
41 - 45		5	5.8
> 45		2	2
<b>Service Years (In Years)</b>			
< 3		11	11.6
3 - 5		19	20.3
6 – 8		21	24.6
> 8		40	43.5
<b>Position</b>			
Flight Attendant		53	53
Senior Flight Attendant		20	22
Purser		18	25
<b>Type of Flight</b>			
Domestic Passenger Flights		28	30
International Passenger Flights		9	10
Domestic Cargo Flights with Cargo in The Cabin		-	-
International Freight Flights with Cargo in The Cabin		54	60
<b>PPE equipment worn on duty</b>			
(Surgical mask)		88	97.1
(N95, NK95)		67	57.4
(Goggles)		86	94.2
(Face shield)		59	65.2
(Gown)		72	79.7
(Suit)		35	39.1
(Hand Glove)		90	98.8
(Foot cover)		56	62.3

### **Flight attendants' perspectives on wearing PPE (personal protective equipment).**

An analysis of the opinions of flight attendants on wearing PPE (Personal Protective Equipment) during the coronavirus outbreak. In 2019, it was found that the overall picture was at the highest level (mean = 4.26, SD = 0.84) and when considering each aspect, it was





found that all aspects were also at a high level, namely personal protective equipment. should have fire protection, non-flammable (mean = 4.56, SD = 0.78) in terms of affecting the performance of flight attendants in terms of decreased breathing ability (mean = 4.38, SD = 0.80), affecting the ability to communicate, such as announcements, commands via safety masks (mean = 4.35, SD = 0.82), causing accidents, such as foot protection. will make it slippery when walking or running (mean = 4.35,

SD = 0.93) such as safety glasses and face shields, visual acuity decreases. Melisma from breathing through the mask (mean = 4.32, SD = 0.83) on the aspect that resulted in decreased mobility of the body (mean = 4.16, SD = 0.81). Wearing a suit in high temperatures for an extended period of time (mean = 4.14, SD = 0.85) on the difficulty of removing an emergency kit (mean = 4.06, SD = 0.85). ability to communicate, such as announcements, commands, and through masks (mean = 4.04, SD = 0.89).

**Table 2** Shows the mean and standard deviation of flight attendants' perspectives on wearing PPE (Personal Protective Equipment).

<b>Flight attendants' opinions on wearing PPE</b>	<b>MEAN</b>	<b>SD</b>
1. Personal protective equipment It should have fire protection properties and not be easily flammable.	<b>4.56</b>	<b>0.78</b>
2. Wearing personal protective equipment results in a decrease in breathing ability. Difficulty breathing decreased the amount of oxygen received.	<b>4.38</b>	<b>0.80</b>
3. Storage of personal protective equipment should be specified when removing it in an emergency so that it does not obstruct the evacuation route.	<b>4.35</b>	<b>0.82</b>
4. Wearing personal protective equipment may cause accidents, such as foot protection. This will make it slippery when walking or running.	<b>4.35</b>	<b>0.93</b>
5. The use of personal protective equipment, such as safety glasses and face shields, reduces one's ability to see. from breathing through a mask	<b>4.32</b>	<b>0.83</b>
6. Wearing personal protective equipment results in reduced mobility of the body.	<b>4.16</b>	<b>0.81</b>
7. Wearing personal protective equipment results in the possibility of syncope, such as wearing a suit in high temperatures for a long time.	<b>4.14</b>	<b>0.85</b>
8. putting on personal protective equipment, such as a zip-back operating jacket Buttons on the back make it difficult to remove the cover in an emergency.	<b>4.06</b>	<b>0.85</b>
9. Wearing personal protective equipment impairs the ability to communicate, such as announcing, commanding, or through a mask.	<b>4.04</b>	<b>0.89</b>



### Flight attendants' perspectives on wearing personal protective equipment during the performance of safety procedures in the event of an emergency

Data analysis of flight attendants' opinions on wearing personal protective

equipment (PPE) during the performance of safety procedures in the event of an emergency was found to be at a high level overall (mean =4.29, SD =0.78) and when considered on a case-by-case basis, it was found that all aspects were also at a high level, namely: and on the occurrence of appropriate atmospheric pressure changes (Decompression) (mean =4.27, SD =0.77)

Table 3 Shows the mean and standard deviation of flight attendants' perspectives on wearing personal protective equipment during the performance of safety procedures in the event of an emergency.

Type of Emergency	MEAN	SD
1. Emergency Landing and Evacuation	4.31	0.79
2. Fire Fighting	4.31	0.80
3. Decompression	4.27	0.77

### Factors of the organization's safety policy prohibiting wearing personal protective equipment

An analysis of flight attendants' opinions on corporate safety policies based on personal protective equipment wearing of personal protective equipment found that overall (mean =4.22, SD=0.81) and on a case-by-case basis, all aspects were also at a high level, namely, dissemination of information on emergency procedures while wearing PPE (mean =4.47, SD=0.72) and PPE provisioning. Minimum CAAT requirements and destination country requirements. Taking into account the qualifications for operating under safety procedures in the event of an emergency (mean =4.39, SD=0.64) on the provision

of PPE (personal protective equipment). Minimum CAAT requirements and destination country requirements. Taking into account the prevention of epidemic qualification according to the Ministry of Public Health (mean = 4.36, SD = 0.69), clearly adding steps related to PPE to the emergency safety manual (value average = 4.34, SD = 0.74) As for the pre-flight briefing, every flight must provide information on operational procedures in case of an emergency while wearing personal protective equipment (average = 4.34, SD = 0.74). Adding a new chapter in the safety manual for operating procedures in emergencies while wearing PPE (mean = 4.03, SD = 0.98) in theoretical training management and practice to know the problems that will arise, how to solve them, and exchange ideas (mean = 3.89, SD = 1.07).



**Table 4** Shows the mean and standard deviation of corporate safety policy for wearing personal protective equipment

<b>Corporate safety policy for wearing personal protective equipment</b>	<b>MEAN</b>	<b>SD</b>
1. Dissemination of emergency procedures information while wearing personal protective equipment (PPE) to inform related persons via E-mail, mailbox, bulletin board, line, and other means.	4.47	0.72
2. Provide personal protective equipment as a minimum requirement of CAAT and destination country requirements, taking into account the qualifications for operating under safety procedures in the event of an emergency.	4.39	0.64
3. Provide PPE as a minimum CAAT requirement and destination country requirements, taking into account the properties to prevent the spread of the epidemic as prescribed by the Ministry of Public Health.	4.36	0.69
4. Clearly adding steps related to PPE to the safety manual in case of an emergency, such as what kind of equipment should be removed, when should PPE be removed and where should it be stored? so as not to obstruct the path of the emergency exit.	4.34	0.74
5. Schedule a pre-flight briefing for every flight. Information on procedures to be followed in the event of an emergency when wearing personal protective equipment must be provided.	4.07	0.86
6. I added a new chapter in the safety manual. For operational procedures in the event of various emergencies while wearing PPE	4.03	0.98
7. Management of theoretical training and practice to anticipate problems, fix them, and exchange ideas.	3.89	1.07

### Suggestions

19.8% of flight attendants thought that personal protective equipment was a barrier to their operations, 18.7% thought that personal protective equipment should be suitable for the use of flight attendants 16.5% There is an opinion that educating and publicizing the use of personal protective equipment It is an important factor in improving the efficiency of safety supervision. 16.5 %

believe that the procedures on board whether in normal or emergencies when using PPE should be clear and be trained in practice. 11% thought that personal protective equipment should be of an appropriate size and appearance. 5.5% of wearers agreed that personal protective equipment should always be adequate, not scarce, and of good quality; and 48.8 % did not leave comments and suggestions.



**Table 5** Shows the number and percentage of suggestions

Suggestions	(n=91)	%
Personal protective equipment should be suitable for the use of flight attendants.	17	18.7
Personal protective equipment impedes operational performance.	18	19.8
Personal protective equipment should be of a size and appearance appropriate for the wearer's physique.	10	11
The procedures on board the aircraft, whether under normal or emergencies, when using PPE should be clear and properly trained.	15	16.5
Education and publicity on how to use personal protective equipment is an important part that enhances the efficiency of safety supervision.	15	16.5
Personal protective equipment should always be provided with proper fit, no shortage, and good quality.	5	5.5
Leave no comment	69	48.8

## Discussions and conclusions

By analyzing the data obtained from questionnaires and recommendations The researcher would like to summarize the results according to the following objectives.

1. Factors affecting the performance of flight attendants in the event of an emergency when wearing personal protective equipment During the coronavirus disease 2019 epidemic, there are

1.1 Properties and types of personal protective equipment: Personal protective equipment should have both epidemic prevention properties and are suitable for the safety performance of flight attendants. Types of devices with high anti-epidemic efficiency that the airline has prepared may cause more obstacles in the performance of safety duties.

1.2 Procedures for performing duties in the event of an emergency should be adapted to the use of personal protective equipment. However, the variety of personal protective equipment has different effects. Details regarding personal protective equipment should be added to the safety manual. including training hands-on training to gain familiarity

1.3 The organization's policy, both in terms of issuing guidelines of the Civil Aviation Authority and issuing a policy of airlines in educating public relations Preparing personal protective equipment and training management Bilateral consultations should be carried out in all relevant departments before guidelines are issued, clearly specifying requirements, types and characteristics of personal protective equipment. for the airlines to follow the same guidelines

2. Problems arising from the wearing of the personal protective equipment of flight attendants during the coronavirus disease 2019 epidemic for performing



their duty of safety during an emergency include:

2.1 Vision problems from wearing safety glasses and face shield The occurrence of fog from breathing through a mask affects perception and decision.

2.2 Movement problems from wearing and operating uniform operating cloak foot protection affect mobility The duration of the ride and may lead to accidents.

2.3 Respiratory problems decreased, difficulty breathing, decreased oxygen intake. from wearing a mask and safety mask.

2.4 Problems with reduced communication capabilities such as announcements, commands, through masks. safety mask and face shield.

From the analysis of the data obtained from the questionnaire and the recommendations, it was found that the hypothesis was true.

3. The wearing of personal protective equipment (PPE: Personal Protective Equipment) of flight attendants during the coronavirus disease 2019 outbreak affects their ability to perform safety duties in the event of an incident. high level of emergency (mean =4.29, SD=0.78)

4. Emergency procedures if flight attendants wear personal protective equipment (PPE: Personal Protective Equipment) during an unclear coronavirus disease 2019 aircraft epidemic. The performance of flight attendants in the event of emergency safety was high (mean =4.22, SD=0.81).

When applying the SHELL Model (SHELL Model, 2021) that shows the relationship between operators and factors in the system that must be interacted with. Compared before and after the research, the results are as follows:

### SHELL Model before research

**E-Situation of the Coronavirus Disease Outbreak 2019(COVID19)**

- People are afraid of the epidemic
- social distancing policy
- Everyone must wear basic personal protective equipment, namely a mask.
- stop flying

**S-The Civil Aviation Authority of Thailand has issued guidelines for servicing passengers on domestic routes during the coronavirus disease 2019 epidemic situation.**

- Airlines implementing guidelines and formulating additional airline policies
- The purpose is to build confidence and be able to return to flight.

**H-Guidelines require flight attendants to use basic personal protective equipment, namely masks and gloves. and other equipment according to airline policy**

- The airline issued a policy for flight attendants. Use additional personal protective equipment in accordance with the requirements of the destination airport. and to increase the confidence of employees and passengers



**The SHELL model shows the relationship between flight attendants and the factors in the systems they interact with (researched).**

**L-H:** There were problems with the use of personal protective equipment that affect the limitations and capabilities of the operators.

-Physical factors: limitations in the transmission of information (sight, hearing, communication).

-Physiological factors: injury, hypoxia movement  
The device is not suitable for different ergonomics.

- The device's properties are suitable for preventing epidemic but not suitable for safety use. and when an emergency

**L-S:** Guidelines from the Civil Aviation Authority of Thailand affect the issuance of airline policies.

- Bilateral consultations should be carried out in all relevant departments before issuing guidelines, clear requirements, types and specifications of personal protective equipment. in order for the airlines to follow the same guidelines

- Procedures for performing duties in the event of an emergency should be adapted to the wearing of personal protective equipment and training. hands-on training to gain familiarity

- educating public relations  
Proper provision of personal protective equipment and training management Contributes to greater safety

**L-E:** Conditions for the use of personal protective equipment should be adjusted as appropriate for the coronavirus disease 2019 epidemic situation.

- Personal protective equipment such as an operating gown Action set  
The current use is not suitable for hot weather.

- The wearing of personal protective equipment is not suitable for the working environment, which is an airplane.

## Suggestions

### Suggestions for utilizing this research

Research on this topic has not been published yet and it was done during the

coronavirus disease 2019 epidemic situation that is not stable. Data storage is sensitive because it may affect the image of the organization. The researcher would like to thank all the contributors very much and hope that this research will be the information that will help in



the development of innovations. Innovations to design personal protective equipment including the issuance of policies of various relevant agencies

### **Suggestions for future research**

Collecting data during the coronavirus disease 2019 epidemic situation will keep accurate data. and more clearly There is a decrease in tolerance. In the next research, other theories or models should be analyzed, such as the TEM Model or to find the relationship of variables by more complex statistical methods.

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