

*A Study on the Relationship among Job Stress Sources, Stress Consequences, and  
Stress Coping Strategies of Airport Ramp Workers in Taiwan*

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0703

The Asian Conference on the Social Sciences 2013

Official Conference Proceedings 2013

Abstract

Ramp safety is a major issue in modern global aviation safety, and ramp workers play a key role in ramp operations. Compared to other staff directly associated with the operations of an aircraft, ramp workers usually have to work in harsh environments under time pressure. The hardship of their work makes their occupation a high-stress job. This study investigated ramp workers in Taiwan, used a stress scale questionnaire design based on literature review and interviews, and performed statistical analyses, to determine the relationship among job stress sources, stress coping strategies, and stress consequences of ramp workers. The research results showed that, ramp workers' job stress sources are positively correlated with stress coping strategies; job stress sources are positively correlated with stress consequences; stress coping strategies are negatively correlated with stress consequences. It is intended that the research results can be provided as reference for competent aviation authorities to attach importance to the high risk operational situation of ramp workers, for airline operators to engage in employee stress management in order to reduce ramp accidents caused by job stress, and improve aviation safety.

**Keywords:** Ramp workers, ramp safety, job stress source, stress coping strategies, stress consequences

## 1. Introduction

The aviation industry is dynamic and vibrant, and is completely different from other industries. Owing to business needs, various skills are required in the aviation industry to deal with all types of problems and special cargo of passengers, both on the ground and in the aircraft [1]. With the launch of cross-strait charter flights for weekends between Taiwan and Mainland China since July 2008, more than 8.94 million passengers have taken the charter flights as of December 2012. Thus, the cross-strait day trip has been formed, which promotes economic and trade exchanges and prosperity, resulting in busier airport operations. According to the statistics of the Civil Aeronautics Administration (CAA), Ministry of Transportation and Communications [2], 385,140 aircrafts were launched from various airports in Taiwan in 2011, and the number increased by 5.1% to 404,695 in 2012. The increasing global flight frequency has increased the stress of airports, and accidents leading to loss of life and property, as caused by improper ramp operations, have also increased year by year. Consequently, ramp safety has become an important issue that cannot be overlooked.

Airport ground-related operations, ranging from airport ramp services to sky kitchens, warehousing, and terminal passenger services, are all handled by professional ground service companies. There are three ground service companies in Taiwan, including Taiwan Airport Service Co., Ltd., Taoyuan International Airport Services Co., Ltd., and Evergreen Airline Services Corp., which provide professional ground services [3]. Airport ramp workers play a key role in ramp operations. However, it seems that their importance to aviation safety maintenance is seldom investigated in studies. In terms of the technical aspect of logistics support, ramp workers guard the “backcourt” to maintain aviation safety. They should be familiar with and abide by standard operating procedures, and pay attention to the regulations regarding the placement of baggage, cargo, and the various operating procedures of all types of aircraft. They should also take notice of the classification, packaging, labeling, transport conditions, placement position, and isolation requirements for dangerous goods, and maintain the safety of ramp work. The qualification and salary of ramp workers are significantly lower than those of other workers in the aviation industry. However, they must work in the harsh environments of strong sunshine, darkness, heat, coldness, strong wind, thunderstorm, noise, hazardous substances, height, heavy goods, dangerous goods, and time pressure. The hardships of their work are indescribable, and their job is a high-stress occupation.

Existing studies concerning job stress mainly investigated the fields of high-tech industries, manufacturing industries, finance industries, and education. However, there are relatively few studies on workers in the aviation industry, especially the ramp workers of ground service companies.

Under the influence of external negative conditions, such as fluctuating oil prices and global recession, airlines around the world have started to streamline their labor force to save on operating costs. Therefore, in consideration of human resources and the high level maintenance of aviation safety, airline operators must reduce human error, flight delays, employees’ absenteeism and turnover, occupational hazards, and ramp accidents in order to achieve the objective of lowering costs. In view of the high risks

of ramp operations, this study analyzed and investigated the relationships among job stress sources, stress coping strategies, and stress consequences of ramp workers in order to assist relevant operators in determining the problems, provide the research results as reference for employee stress management, and enhance the improvements and attention to ramp operations of airline operators for competent authorities to improve aviation safety.

## **2. Literature Review**

### **2.1 Aircraft Ground Handling**

The ICAO Airport Economics Manual document No. 9562, as published by ICAO (International Civil Aviation Organization), divides aircraft ground handling services into “airport terminal services” (passenger check-in formalities and handling of baggage and cargo) and “ramp services” (handling, cleaning, and maintenance of aircrafts). Ramp workers drive vehicles and use ground support equipment (GSE) to provide rapid and efficient ground handling services for the transit and return of various types of aircrafts [1]. The major tasks of ramp workers are to ensure the safe and efficient carriage of passengers and their baggage, ensure the safe and efficient carriage of cargo, fully perform pre-flight inspections, assist in aircraft pushback operations, and prepare for cabin cleaning and meal services for the next flight. This study mainly defines ramp workers as the personnel engaging in various preparatory operations at airport airside ramps after an aircraft is parked.

### **2.2 Job Stress**

#### **2.2.1 Definition of Job Stress**

In terms of job stress, Kahn (1964) first introduced the stress management theory into business management in order to initiate an investigation into stress issues at work. Job stress sources include personality traits, achievement motivation, and work overload [5]. Job stress is different from life and environmental stress, as it is a unique stress source caused by the characteristics of a job [6]. Job stress is a complicated concept, and stress sources vary with occupations. In addition, stress sources may interact with environmental and individual characteristics. Once an individual believes that their capacity cannot endure or undertake current working conditions, and a balance between their individual life and work cannot be reached, job stress is produced [7]. According to various scholars’ opinions on job stress, this study defines job stress as the psychological and physical discomforts experienced by an individual when the balance between individual capacity and the requirements of an external work environment cannot be reached, and they find that the environmental requirements exceed the scope of their individual competence.

#### **2.2.2 Categories of Job Stress Sources**

Many studies indicated that physical symptoms are representative of different job stress sources, and are directly associated with them. Sutherland and Davidson [8] classified job stress sources into seven categories, including work vagueness, work overload, labor force shortage, organizational culture and climate, time pressure, management roles, and interpersonal relationships. Burke [9] classified job stress sources into six categories, including physical environment, role stress source, organizational structure, work characteristics, relationship with others, and “career

development and occupation family conflict.” This study selected ramp workers that work in a unique environment as the subjects. According to the above classification, opinions from many experts, scholars, and assessment of the current status of ramp workers, this study classifies the job stress sources of ramp workers into four dimensions, organizational environment, interpersonal relationship, workload, and career development.

### **2.3. Stress Coping Strategies**

Stress coping strategies may alleviate stress, namely, the adoption of positive stress coping strategies can help alleviate stress [10]. The most effective solution for an individual to cope with high job stress is to leave the work environment. However, after considering real life and economic factors, most people usually have no choice but to face stress in order to make a living. Consequently, under the situation that employees cannot leave their work environment, they will usually try to adopt preventive or coping behaviors to alleviate discomforts. Lazarus and Folkman [11] pointed out that, “coping” is an individual’s constant change in perception and behavior to deal with specific conditions beyond their assessments and individual resources, which is a dynamic process. Such coping behaviors are the unique behaviors of individuals when dealing with external threats, and are called stress coping strategies. According to the perspectives of various scholars, the stress coping strategies to be adopted can be generally divided into problem-solving, seeking support, rational thinking, and emotional adjustment. Based on various scholars’ generalization of job stress coping strategies, this study divides stress coping into problem-solving, seeking support, rational thinking, and emotional adjustment.

### **2.4 Stress Consequences**

The research results of the Health and Safety Executive, U.K. showed that the negative influences of workplace stress on an organization include, employees’ low work commitment to an enterprise/organization, decreased work performance and innovative capacity of employees, increased turnover and turnover intention of employees, poor attendance, increased leave and absenteeism of employees, difficulty in employee recruitment and poor intention to stay, decreased satisfaction of employees and clients, damages to the image and reputation of an enterprise/organization, and potential litigations. Based on the stress consequences above, this study divides stress consequences into physical symptoms, psychological symptoms, job satisfaction, and turnover intention.

### **2.5 Relationship among Various Research Variables**

#### **2.5.1 Study on the Correlation between Job Stress Sources and Stress Coping Strategies**

Chen [13] found that, the higher the job stress perceived by airport ground staff, the higher the frequency of the use of coping strategies. Staff’s use of coping strategies is significantly correlated with workload, interpersonal relationships, environmental factors, and supervisory factors. The use of coping strategies not only reduces the

negative influences of job stress on physical health, but also reduces the negative influences on psychological health. Therefore, stress coping strategies play a very important role in stress coping processes, and the use of more positive coping strategies will alleviate the negative influences of job stress sources on physical and psychological health.

### 2.5.2 Study on the Correlation between Job Stress Sources and Stress Consequences

Stress will lead to physical diseases, most of which are related to physiological functions. Studies in the 1930s verified that stress will lead to physiological diseases or somatoform disorder. Somatoform disorder refers to the physical illness caused by stress or other psychological factors. Common symptoms include hypertension, gastric ulcer, asthma, and migraine or tension headaches [14]. The Department of Health [15] indicated that, if individuals experience the symptoms of poor memory, negative thinking, indecisiveness, and failure to concentrate, they are exposed to excessive psychological stress. When individuals face long-term stress, they will experience different physiological responses, such as increased frequency of headaches, muscle tension, skin allergies or dry skin, poor digestive system, rapid heartbeat, and chest pain. Stress also has negative influences on psychological health, and can lead to frequent anxiety, depression, and drug and alcohol abuse [16].

### 2.5.3 Study on the Correlation between Stress Coping Strategies and Stress Consequences

Lin [17] found that the use of positive stress coping strategies can help alleviate stress consequences, thus, the psychological and physical conditions are less likely to be affected. Kao [18] found that the use of coping strategies can adjust the influence of job stress on stress consequences, especially to protect physical and psychological health from the menaces of stress. Huang [19] found that, if air logistics officers in Taiwan adopt positive stress coping strategies to face problems and relieve emotions, and solve problems by taking action or developing perceptions, their work performance will be effectively improved, and their turnover rate will be significantly reduced.

## 3. Research Method

### 3.1 Research structure

The research structure was developed based on the research objectives and literature review. This research structure intends to investigate the correlation among job stress sources, stress coping strategies, and stress consequences of ramp workers, as shown in Figure (1):

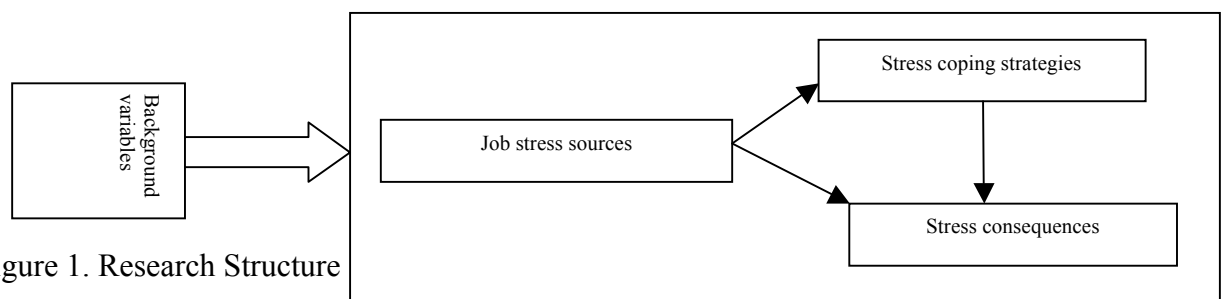


Figure 1. Research Structure

### 3.2 Research hypotheses

H1: There is a significant correlation between job stress sources and stress coping strategies of ramp workers. H2: There is a significant correlation between job stress sources and stress consequences of ramp workers. H3: There is a significant correlation between stress coping strategies and stress consequences of ramp workers.

### 3.3 Research subjects

The research subjects were the ramp workers of three ground service companies in Taiwan (Taiwan Airport Service Co., Ltd., Taoyuan International Airport Services Co., Ltd., and Evergreen Airline Services Corp). The sky kitchen and cabin cleaning personnel were excluded from this study. A total of 390 questionnaires were distributed to conduct the questionnaire survey.

### 3.4 Analysis Methods

This study conducted a questionnaire survey and coded the returned valid questionnaires. This study used the Linear Structure Relation Model (LISREL) to analyze the correlation among the various variables, including job stress sources, stress consequences, and stress coping strategies. Moreover, this study used two software packages, SPSS 18.0 and LISREL 8.52, to analyze the data.

## 4. Empirical analysis

This study referred to goodness of fit evaluation indicators, as proposed by Chou [20], in order to judge the linear structural equation model. After the data were revised, the goodness of fit of the overall model is: Chi-Square ( $\chi^2$ ) =296.62; Chi-Square ratio= 3.05; CFI= 0.96; AGFI= 0.87; GFI= 0.93; IFI= 0.96; NFI= 0.95; NNFI= 0.94; RMR= 0.087 and RMSEA= 0.07. Most of the indicators are within the standard scope, suggesting that the goodness of fit of the overall model is good, and can explain the cause-and-effect relationship among the three variables.

According to the results of LISREL empirical analysis and testing, job stress sources have a significant positive effect on stress coping strategies; job stress sources have a significant positive effect on stress consequences; stress coping strategies have a significant negative effect on stress consequences. The correlation model among job stress sources, stress coping strategies, and stress consequences, as developed in this study, is as shown in Figure 2, where the solid line denotes a significant path, the dotted line denotes a non-significant path, values without brackets denote path coefficients, and values in brackets denote the t-value of the path.

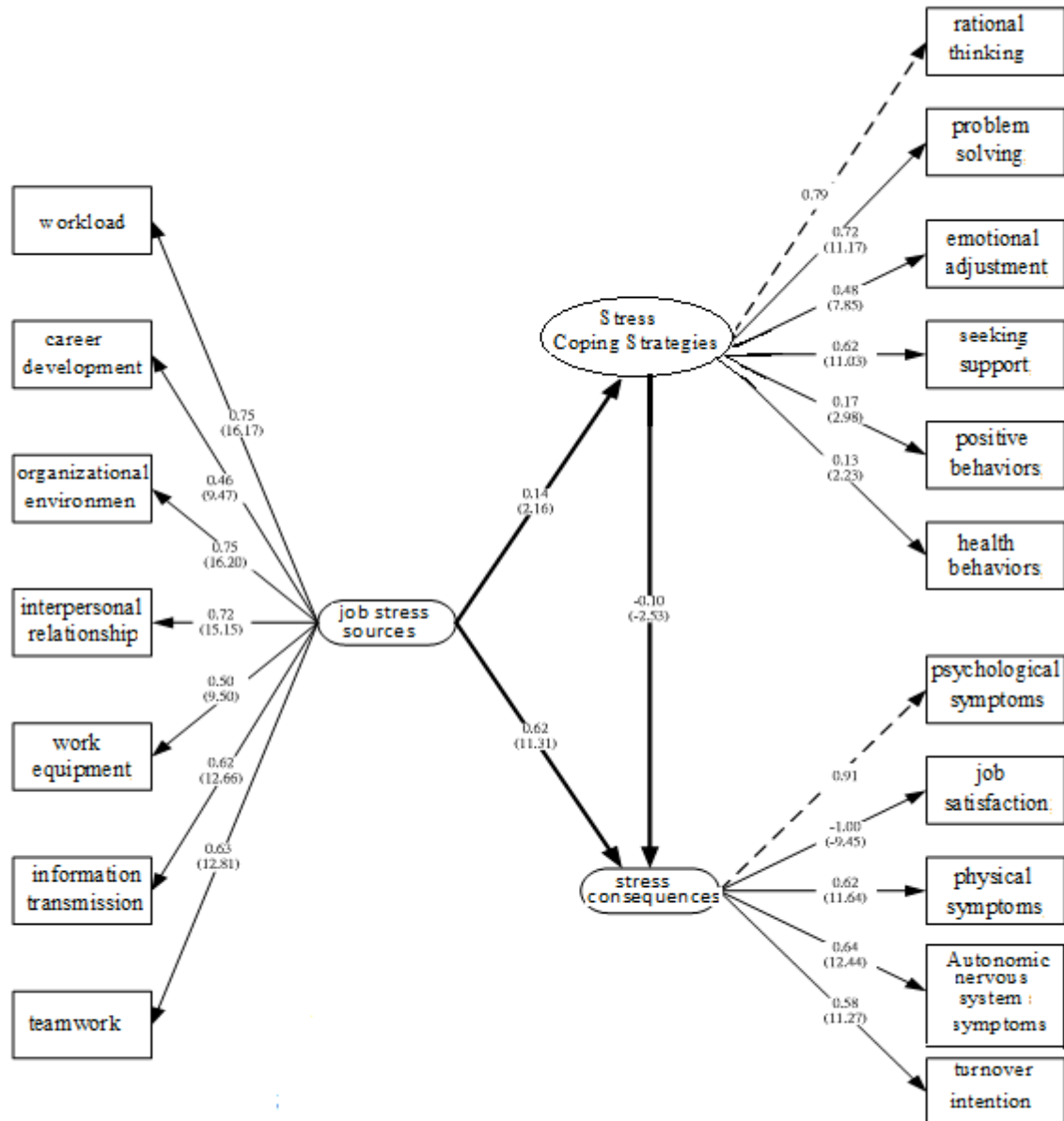


Figure 2. Path Model of Correlation among Job Stress Sources, Stress Coping Strategies, and Stress Consequences

## 5. Conclusion and Suggestions

### 5.1 Conclusion

This study developed LISREL to investigate the relationships among job stress sources, stress coping strategies, and stress consequences of ramp workers. The results showed that the goodness of fit is good, and there is a significant correlation among “job stress sources,” “stress coping strategies,” and “stress consequences.”

### 5.2 Suggestions

The ramp workers in Taiwan generally suggested that their working hours are too long. In addition, the restricted working hours caused by high flight frequency, delays,

and efficiency requirements, tend to result in excessively high job stress. Therefore, airline operators are advised to propose management measures, such as additional overtime pay better than that regulated by the government, increased labor force, reasonable leave system and time planning, as well as following the example of high-tech industries to provide employees with stress relief devices and measures, such as additional leisure centers and the provision of relevant stress relief courses, which can enable employees to alleviate the stress they face, reduce their workload and turnover rate, and improve aviation safety.

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