Coping Stress of Pilot of Commercial Aircraft after the Crash

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Abstract
The plane crash is a traumatic experience in the life of someone, especially a pilot because it has the burden of responsibility on the safety of the passengers. This study aims to determine the coping stress post-crash of a commercial airplane pilot. Coping stress is an individual effort in managing the full load condition, exert efforts to solve the problem, and try to control or reduce the pressure. Coping stress is necessary to a pilot who has ever been in a plane accident to address the impact of accidents or incidents such as stress, anxiety, and trauma in order to have a good working performance. This research is aimed at finding the way the pilots cope with their stress while remain working as pilots after experiencing flight accidents. In-depth interviews conducted on four men who worked as a commercial pilot (20-40 years old when the accident or incident happened) who had experienced a plane accident or incident and are still working as a pilot. The method used in this study is a qualitative descriptive. These results indicate that the three subjects first performed emotional focused coping and one subject did post-crash problem focused coping. In general, all four subjects combined emotional focused coping and problem focused coping to overcome the effects of accidents or incidents, such as stress, anxiety, and trauma.

Keywords: *coping stress, pilot, crash*

Introduction

The safest transportation in the world is aircraft because it has the most sophisticated security systems and a standard procedure applicable to the aircraft maintenance system (Hakim, 2010). However, it still has a possibility of a plane crash. Commercial aircraft is air transport services to carry or move people or goods from one place to another. An airline needs to have the air operator certificate and operations specifications such as documents that tell about the air or weather conditions, authorization, and limitations of airline operations (Wells, 2001).

In the last five years, National Transportation Safety Committee (2011) claimed that 59 accidents (accident) and 39 serious aircraft incident have occurred in Indonesia. There 219 victims were dead or missing and 67 injured. Hubert (2008) mentions that the statistical results showed as much as 67.57 percent of the main causes of air accidents is human error factor and as much as 20.72 percent of accidents occur due to technical errors. While only 5.95 percent of aircraft accidents worldwide occur due to bad weather.

Human error is a condition in which someone made a mistake when doing work or carry out tasks related systematically with the features of the machine or electronic equipment used by humans (Dekker, 2006; Wiegmann and Shappell, 2003). According to Wells (2001), human error occurs not only pilot in command at the time, but can also occur at the concierge air traffic controllers, technicians and aircraft mechanics, cabin crew and caterers. Reason (1997) proposed what is referred to as the "Swiss Cheese Model" of system failure. Every step in a process has the potential for failure. The ideal system is analogous to a stack of slices of Swiss cheese. Consider the holes to be opportunities for a process to fail, and each of the slices as "defensive layers" in the process. An error may allow a problem to pass through a hole in one layer, but in the next layer the holes are in different places, and the problem should be caught. Each slice of cheese is an opportunity to stop an error. Pilot is the last successive layers of defense, barriers and safeguards of an airplane. Pilot can catch/stop errors that may occur during the flight, but if unfortunately pilot can't stop errors and accident happened will cause a certain impact on him.

When an aircraft accident occurs, it can cause a certain impact on someone, especially on self-pilot who flew the plane because of the burden of responsibility for the safety of lives of the passengers and can lead to stress, anxiety or trauma in him later on when flying the aircraft after experiencing tragedy accidents (Martinussen & Hunter, 2010). According to Trollip and Jensen (1991), when he started flying again after being convicted of a no-fly post-crash, a pilot may lose confidence when flying the aircraft at the memory of the events of his accident. The memory can bring a sense of doubt the ability of self as a pilot, attention, and concentration is reduced that effect on its performance. This can increase the stress level of the pilot while working and if not treated properly, the stress level increases until it turns into anxiety decrease the speed of response in controlling the aircraft.

Coping required to overcome the trauma, anxiety, and stress that happened in pilot after the crash. Coping is a constant cognitive change action and behavior is an attempt to cope with the demands of internal or external rated overload or exceed the resources owned by the individual (Lazarus & Folkman, 1984). According to Taylor

(2009), coping aims to reduce the environmental conditions that can cause harm, to adapt to negative events or the reality of what happened, to maintain a positive self-image, to maintain emotional balance and to continue satisfying relationships with others. According to Trollip and Jensen (1991), during the pilot flying the aircraft has a great responsibility for the safety of passengers and the required high vigilance in controlling the aircraft for smooth flight. Therefore, the pilot who had an accident needs to do coping strategy was good and right in order to increase the confidence of the flying ability so as to have a better work performance than before.

According to Lazarus and Folkman (1984), there are two strategies for coping, the problem focused coping and emotional focused coping. Problem-focused coping is an attempt to cope with stress by adjusting or changing the problems encountered and the surrounding environment that causes a person distress. While emotional focused coping is an attempt to overcome the stress that a person by regulating emotional responses in an attempt to adapt to a condition or situation is considered stressful. Taylor (2009) states that people tend to use both simultaneously coping strategies because both are equally useful.

Stress reduction strategy that is focused on the issue (problem-focused coping) is divided into three forms, namely: (a) confrontative coping, describe efforts to change the situation or problem aggressively, and describe the level of anger; (b) planful problem solving, described efforts to change the situation carefully in addition to using an analytical approach to problem solving; and (c) seeking social support, described efforts to seek external support in the form of information, support real and emotional support (Lazarus & Folkman, 1984). Billings and Moos (in Dewe, O'Driscoll, & Cooper, 2010) added two kinds of stress alleviation centered on the issue (problem-focused coping), the active-cognitive-behavioral coping and active coping. Active-cognitive coping is a way which is owned by an individual to cope with the stress that is experienced by way of a positive perception of a stressful situation and think about alternative solutions. While individuals who cope with stress by active-behavioral coping, consult with others about how the right way to cope with a stressful situation, try to find out more about a stressful situation, and take positive steps to overcome them.

Lazarus and Folkman (1984) also divide the stress coping strategies centered on emotions (emotional focused coping) into five, namely: (a) distancing, describes the reaction of escape or attempt to not be involved in the matter; (b) self control, describe efforts to regulate their feelings and actions taken to remain calm; (c) accepting responsibility, describe their awareness of their role in the problems faced and tried to accept everything correctly; (d) escape avoidance, described efforts to avoid or escape from problems; (e) positive reappraisal, described efforts to create a more positive meaning is intended for personal development also involves matters of a religious nature. Billings and Moos (in Dewe, et al., 2010) added avoidance as an individual effort in tackling stress. Individuals who apply avoidance in the response to stress can be defined as individuals who ignore the situation, deflecting attention to other issues, or engage in activities that please him and disrupt the process of resolving problems.

Method

Subjects. The subjects included four people and domiciled in Jakarta. Subjects were young adult males aged 20-40 years (Papalia, et al., 2009) when the plane crash occurred. Subjects worked as a commercial airline pilot and had an aircraft accident. Plane crashes experienced by subjects that occured within a period of approximately five years and the subject still working as a pilot. The number of casualties and material losses suffered in a plane crash the subject is not specified.

Instruments. This research was a qualitative descriptive with in-depth interview techniques. Instruments used in this research is interview, informed consent, stationery, paper, and recorder.

Procedure. Researchers were looking for suitable subjects predetermined criteria and had recommendations by Operations Manager from an airline in Indonesia. Researchers prepared interview guidelines and contacting potential subjects who fit the criteria of research to conduct interviews. At the agreed time, the researchers met the subjects and build rapport with the subjects so that the subjects felt comfortable and could provide real data. The researchers explained to each subject's identity and the interviews will be guaranteed confidentiality. After agreeing to be interviewed, the subjects were asked to fill out an informed consent. At the interview, the researchers recorded the time and place of the interview, as well as things that were considered important for the completeness of the data. After getting the data from interviews, researchers performed data processing by creating a verbatim transcript as well as analysis and reflection. All interviews were conducted within a span of three months, starting from December 13, 2011 until March 20, 2012. Two of the interview conducted at home and four interview subjects made public upon request subject. The interviews were conducted twice on two subjects and one on two other subjects to get the full data. The entire interview data into confidential data. Name of the subjects and the companies disguised in the discussion of research results.

Results

Subject	1 (SM)	2 (HA)	3 (UK)	4 (PS)
Age, marital status	33 years old, married (3 children)	36 years old, married (2 children)	37 years old, single	39 years old, married (2 children)
Background of flying school and working	scholarship from airline "X", Flying School in Australia	scholarship from airline "X", Flying School in Australia	scholarship from airline "X", Flying School in Australia	scholarship from airline "X", Flying School in Australia
Airline (NOW) and experienced of flying	Airlines "Y" in Jakarta 19 years old (above10.000 hours of flying)	Airlines "Y" in Jakarta 18 years old (above 10.000 hours of flying)	Airlines "Y" in Jakarta 19 years old (above 10.000 hours of flying)	Airlines "Y" in Jakarta 20 years old (above 10.000 hours of flying)
Accident happened	2007, Kuching – Malaysia, as pilot monitoring (first officer)	2011, Pekanbaru – Indonesia, as pilot flying (instructor)	2009, Padang – Indonesia, as pilot flying (instructor)	2006, Surabaya – Indonesia, as pilot monitoring (captain)

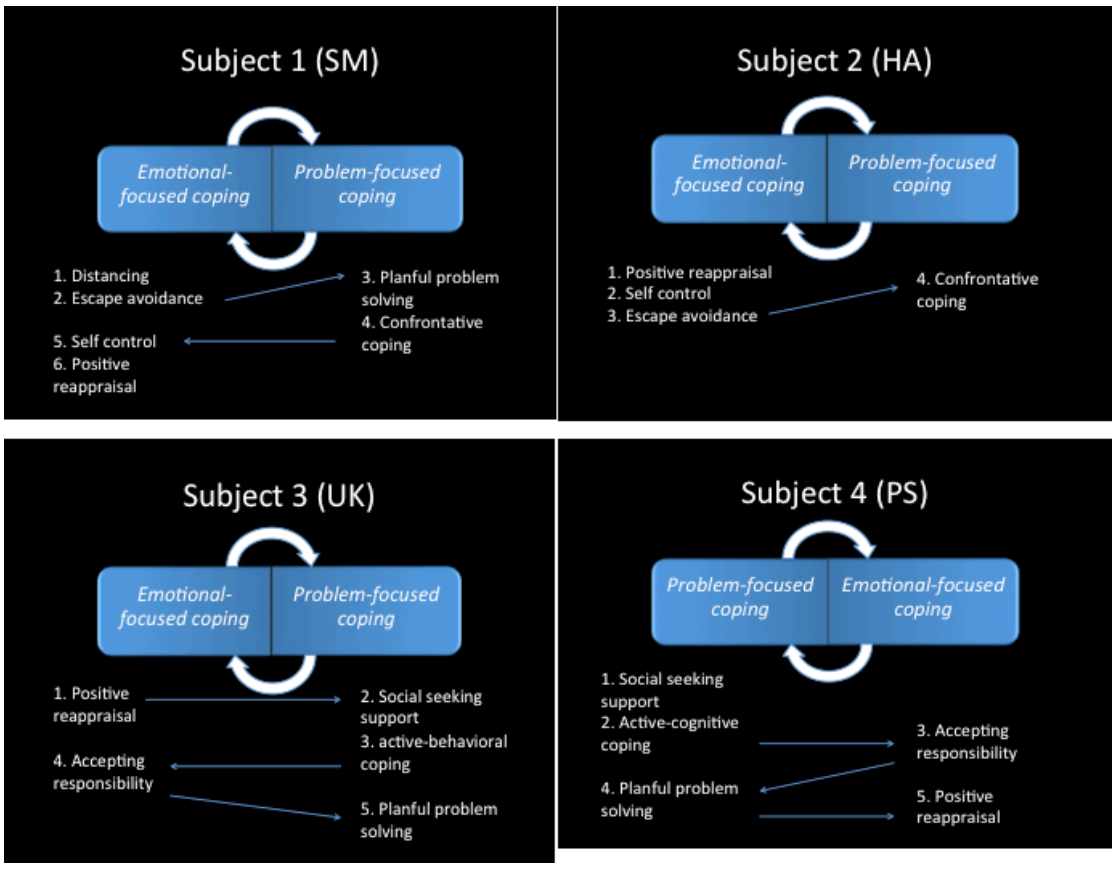
Table 1. Subjects Background

Subject	Cause of accident	Effect
1 (SM)	Human error (visual illusion), bad weather	Grounded and lost of license for 6 months. Financial Stress, bad memory of the accident, trauma
2 (HA)	Human error (fatique), bad weather, airport (short runway)	Grounded for 4 months. anxious, self-instropection, doubt to make decision during flying
3 (UK)	Human error (fatique), bad weather, airport (short & slippery runway)	Grounded for 2 weeks. Panic when accident happened, asking the causes of accident, anxious
4 (PS)	Human error (fatique), technical problem, bad weather	Grounded for 3 months. Back work as a co-pilot for 6 months. Stress about the investigation, sad, anxious, trauma

Table 2. Cause and effect of accident

Subject / Coping strategy	1 (SM)		2 (HA)	3 (UK)	4 (PS)
Problem-focused Coping :					
Confrontative Coping	4		4	-	-
Planful Problem Solving	3		-	5	4
Social Seeking Support	-		-	2	1
Active-cognitive Coping	-		-	-	2
Active-behavioral Coping	-		-	3	-
Emotional-Focused Coping :					
Distancing	1		-	-	-
Self Control	5		2	-	-
Escape Avoidance	2		3	-	-
Accepting responsibility	-		-	4	3
Positive reappraisal	6	1	1	5	
Avoidance	-	-	-	-	

Table 3. Coping strategies



Pictures show how each pilot did their coping strategies.

Explanation

Accident Experiences. Prasetyo, et al. (2005) mentions the concept of 5M related to aircraft accidents, that man, machine, mission, medium, and management. Man as the human element, in this case associated with the pilot as the main component. Machine is usually associated with the condition of the aircraft. Mission linked to the goal-setting flights by various risks that may be encountered. Medium is the bad weather conditions in the aviation and infrastructure constraints. Management is an error of selection, education, training or exercises, equipment, flight safety, and operational control.

Subjects SM and PS had the same factors that cause accidents, namely the factor of man and medium. In addition, accidents suffered by PS influenced by machine. HA and the UK have in common their accident was caused by the man, medium, and management.

Medium factors that cause accidents on the four subjects were their unfavorable weather conditions when the accident occurred. Common element management in the occurrence of accidents suffered by the HA and the UK are in operational control by the airport to manage or perform maintenance on inadequate foundations, such as the rubber deposits were not removed at the runway so as to make the runway and aircraft wheel becomes slippery when grounding in a state wet. Factors machine in accidents suffered by subjects of PS in the form of damage to aircraft engines so it is difficult to control when the plane landed.

Each subject is influenced by elements of a different man. Factors man in SM is located at the time of the accident captain made a mistake in decision making. Accidents experienced by the subjects HA, elements of his man lies in the ATC officer incorrectly informing the state of the wind. Subjects UK has a man factor in itself being in a state of fatigue and stress levels rise time of the accident. Factors man in a plane crash experienced by PS found on aircraft technicians who do not provide accurate information about the true condition of the aircraft engine, he just said that its indicator lights were broken and not the engine.

Human errors. Human error contributing to accidents suffered by the four subjects. However, where the mistakes or human error that occurs in each accident was different. Human error made by the captain who flew the plane when the SM plane crash in the form of decision making errors. Misinformation given by the ATC officer pilot in command is human error in accidents suffered HA. Location of human error in accidents suffered by the UK is itself in the form of stress and fatigue levels are rising at the time. Human error contained in aircraft technicians who do not write the history of damage to aircraft in flight history books completely and correctly, causing accidents suffered PS.

Effect of the accidents. SM traumatized by the state of fog, especially during dark conditions after his accident. Throughout grounded moment, SM revealed that reading books flight and find out the cause of the accident only added stress. After the accident, SM has got terminated from the company where he worked as a freelancer employee. This situation made SM stress because he did not have a job for a few

months and had no income. SM then got a job and could start working again at the X arline after grounded period ends.

HA had felt anxious about his ability as a pilot on the day after the accident occurred. HA felt anxious because less than 20 hours a similar accident occured by colleagues at the same airport. The desire to forget about the accident becomes blocked because HA remembered knowing that his friend also had an accident at the same airport. When the subject HA got home, he thought what was wrong so that God gave him the trials with the accident. Memories of the accident that appears was the primary stressor on self-HA and be thinking for days that made him uncomfortable with it. The process of self-introspection conducted HA aims to find a way to forget the memory of his accident.

As a result of accidents experienced HA, he got the punishment ban of NTSC for about 4 months. Although it may not fly, HA still get a basic salary of the company and the time to start working again HA remains the captain. But when it made its first flight since 4 months does not fly, HA doubt the power of flight. Doubts arose when landing at the airport in Pekanbaru and make HA fly depressed with the situation at that time. Feelings of anxiety and doubt disappear after he succeeded in landing and HA become confident again with his flying ability.

Post-accident aircraft experienced UK, he wondered about the cause of the accident. UK did not think he was able to experience a plane crash when he was an instructor at the airline X and often experience severe weather conditions of the day, but always able to control the aircraft properly. As a result of accidents experienced UK, he got a penalty ban for 2 weeks, and then he took a leave of absence for two weeks so that the total he did not work for 1 month. This has no effect on the earnings and career in the UK airline Y. He remains a captain and instructor until now. But after her period ends grounded, UK has an impact in the form of anxiety every time you make a flight to Padang airport especially during rainy conditions. UK always remembered the events of the accident.

PS has anxiety and post-accident trauma every fly to Surabaya. Trauma that happened a long time, about two years until the PS gain new aircraft type rating anxiety and trauma is gradually lost. In addition to trauma and anxiety, PS also feel the stress facing trial in the office and in NTSC. PS stress due to fear that if he was fired by the company and found guilty by the NTSC so he fined or even imprisoned. But after the investigation is completed, the airline company where PS work took the decision to lower the PS positions of captain became a co-pilot on the recommendation of the NTSC. This made PS feel very sad.

Coping stress.

Problem Focused Coping. At the time SM started to fly again, he prepared hisself by reading books related to the cause of the accident. SM did planful problem solving because he wanted to really be able to understand Approach Landing Accident Reaction so he is more vigilant in conducting a flight. With this, SM felt can help him overcome the trauma. When flew SM did confrontative coping to handle his trauma when through the dark fog conditions. Confrontative coping done in order to change

the state or condition himself, who was anxious to be more calm and ready for landing.

HA did confrontative coping to overcome doubts about the ability of flight when he began to fly again. HA faced the problem by changing the state of uncomfort zone into a comfort zone and judging a good opinion of the instructor. Uncomfort circumstances HA zone was a condition when performing flights to Pekanbaru after not flying for about 4 months. HA felt hesitant and questioning himself, did he capable or not to conduct such flights. Then he thought that the problem had to face so that he could go ahead and release the load or the fear that he felt.

UK contacted the safety director at the company where he worked on the night after the accident to find out information about his situation. UK did seeking social support and active-behavioral coping to overcome the traumatic experience he had just endured. Active-behavioral coping performed by the subjects as a positive step to cope with stress after the accident to find out the cause and why it happened to him. While seeking social support were made by UK in an attempt to gain emotional support as well as information right from the source he could trust. In this case UK contacted the safety director who knows very well about the new experienced so that he could cope his stress on the spot. UK also did planful problem solving by always anticipating the form of raises memories of accidents in each flight to increase alertness so that he could cope with the anxiety felt. According to the UK, this is a positive thing because he had a higher awareness than before so that he could act more cautiously again while fly an aircraft.

PS handled his trauma through accepting responsibility in the form of increasing self-awareness, increase great responsibility towards the success of a passenger ratings and responsibilities as an instructor on his student. Then PS did planful problem solving by analyzing differences in the workings of the aircraft type MD and Boeing as he gets the opportunity to fly Boeing type aircraft. PS expressed his confidence came back when he flew with Boeing and less traumatized to disappear altogether.

Emotional Focused Coping. SM did coping with distancing way until he started training to fly on the airline X. SM did not want to open a book about aviation and chose to withdraw from social interaction with coworkers fellow pilot because he though it made him more stress. SM did escape avoidance to avoid the question of his wife, family and others for asking questions of him because it will remind him at accident scenes and made himself burdened with the role at home that support his family. SM avoided by frequently travel outside the home, such as playing golf or having fun entertaining yourself. Then when he started flying back, SM performed self control to make himself calm by means of positive self-talk when he began to feel tense and anxious when the plane were going to landing. Having to cope with the trauma, SM did positive reappraisal to take lessons from the events that happened. SM grateful to the incident because of the traumatic experience that he experienced could be a lesson for other pilots and be better than ever.

HA did positive reappraisal post-crash by not burdening himself and guided by the belief that every event must have a meaning and we could learn from it. HA was also guided by the Quran so that it took lessons from the events that happened. HA did self control in an attempt to convince himself that what he was doing is right because

there were opinions from other people or experts what they learned from the books they read. HA did not want to remember the events of the accident and focus on other things, he did escape avoidance. With escape avoidance, perceived stressors HA did not develop into stress.

After UK managed the plane until it parked, he did positive reappraisal to feel grateful because the plane could be stopped and the condition was normal. UK also had a pleasure to rest at home throughout grounded duration. He could do his hobbies, such as fishing on an ocean with his friends and totally rest before back to fly again. UK also took lessons from events experienced as learning to colleagues or other pilots.

After the trauma had gone, PS did positive reappraisal to take lessons from the incident that happened as a lesson for the sentences and demoted when he became co-pilot so that PS could share his experienced on other pilots when he teach them now in a CRM (Crew Resource Management) class.

Conclusion

- Two main causes of accidents were human error by the pilots and bad weather.
- Pilots coped their stress by combining two types of coping strategy, parallel or switching.
- Positive reappraisal is the only one of coping strategy that showed in all participants. They can still be grateful even though an accident happened.
- Subject who thinks an accident happened because of external factors can successfully perform quick coping.

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