GROSTLOG 2018
Global Research on Sustainable Transport & Logistics

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/atlr

Do Passengers' Knowledge Affect On Flight Safety?

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Abstract

Lithium batteries that are now widely used can indeed explode if exposed to excessive heat or short curcuit. Now not only smartphones or laptops, Powerbank devices and drones also use batteries and are often taken to travel.Therefore on April 1, 2016 the International Civil Aviation Organization (ICAO) decided to ban cargo in the form of lithium-ion batteries in passenger aircraft, even for bringing it into cabin, Lithium Powerbank has a capacity limit requirement that must be obeyed by all passengers who carry it in order to prevent and protect cabin crew and aircraft passengers from current risks to flight safety. The purpose of this study is to examine how much the level of knowledge of passengers about the safety of the use of Lithium Powerbank on Flight, because there are still many passengers who carry goods that contain Lithium Powerbank in the cabin or luggage that exceeds the capacity. The results of this study indicate that passengers who use flight services know enough about safety standards regarding the use of Lithium Powerbank on flights. However, there is still much needed counseling and tighter checks and more about Lithium Powerbank safety standards on flights so that flight safety, especially in Indonesia, increases and reduces the rate of accidents / explosions especially caused by Lithium Powerbank. This study uses semi-quantitative methods that focus only on lithium battery types of Powerbank devices. So for the research it can analyze about the other devices of lithium battery.

Keywords: Passenger Knowledge, Lithium Battery, Dangerous Goods, Flight Safety

Introduction

Transportation procedures and standards that carry dangerous goods is necessary in order to reduce the risk of accidents caused by errors in handling transportation. Comprehensive standards and procedures are required to reduce the risk of accidents caused by error in handling of dangerous goods transportation. (Penerbangan, Tinggi, Adisutjipto, Janti, & Lanud, n.d.) A recent incident at Los Angeles International Airport 3LAX), where lithium cells in transit were abused and caused to burn is one example of lack of knowledge about the danger of

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/atlr

lithium Powerbank when taken to the cabin. With the incident in Los Angeles concerning the Lithium Powerbank case, it has already illustrated how current regulations fail to guarantee confidence in safe transportation (Farrington, 2001) So that the use of Lithium Powerbank which is now widely used can indeed explode if exposed to excessive heat or short curcuit. Now not only smartphones or laptops, Powerbank devices and drones also use batteries and are often taken on trips, therefore on April 1, 2016 the International Civil Aviation Organization (ICAO) decided to ban cargo in the form of lithium-ion batteries (Powerbank) in passenger aircraft, even to be brought into the cabin Lithium Powerbank has a capacity limit requirement that must be obeyed by all passengers who carry it in order to prevent and protect passengers, cabin crew, and aircraft from current risks to safety. Since the many cases of Powerbank lithium batteries exploded, several airline associations issued various restrictions regarding the carrying of lithium batteries with too high capacity.

The existence of the above incidents and other incidents that are not accompanied here and the regulations that have been made accordingly, have improved the understanding that aviation safety is a very important factor of passengers' safety. Furthermore, both passengers and the cabin crew should understand the aviation safety so that the flights can be smooth and safely landed on the destination. Meanwhile, many passengers know safety or understand but often ignore (Pinem & Dewanti, 2015), therefore this paper was made with the aim of knowing how many aircraft passengers know the rules regarding to limitation of Powerbank's lithium capacity, analyzing the level of knowledge of passengers about the safety standards of lithium Powerbank usage on aviation, thus reviewing whether this regulation has been carried out effectively or not to all passengers or potential passengers regarding flight safety standards that can be affected by lithium Powerbank.

Lithium batteries are preferred in applications where they have low weight or small volumes desired by electronic devices such as laptops, cell phones, and

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/atlr

electric vehicles. Lithium batteries have the highest energy density of all rechargeable batteries. (Ceder et al., 1998) but Lithium Powerbank besides having the advantage that everyone likes it, on the other hand the use of Lithium Powerbank have a bad impact especially on airplanes for capacity that exceeds the provisions. Increasing knowledge does not always cause changes in behavior, but there is a positive relationship with behavior change. The level of one's knowledge is closely related to the level of formal education. (Akhir & Alami, 1985) To ensure the safety and security of aviation using airplanes, all flight safety requirements must be met, such as carrying a Lithium Battery capacity in accordance with applicable regulations. (S, 2011).

The regulation concerning the prohibition of Powerbank type Lithium Battery was issued by the Director General of Air PHB in the Circular Letter Number 15 of 2018 which was set on May 09 2018. The backup Powerbank or lithium battery must be carried by passengers and aircraft personnel must fulfill several conditions. Among them the lithium powerbank brought into the aircraft is not connected to other electronic devices. Powerbank must be placed in the cabin baggage and banned on checked baggage. Equipment that can be carried only has hourly power (watt-hour) of not more than 100 Wh. While hourly power is more than 100 Wh, but no more than 160 Wh must get approval from the airline and it is allowed to carry a maximum of two passenger units.

Actually, the rating of Wh that has been determined by the Ministry of Industry is at the back of the Powerbank device, but not infrequently the Powerbank manufacturer does not specify how much Wh on their device is. In this study, the author wants to provide information to find out if your power bank can be taken up into the aircraft cabin. How to calculate it as follows, battery capacity: 1000 (from Mega Ampere to Ampere) Xvoltase with battery capacity with units of Ah. If you look at the formula, the maximum amount of capacity that can be carried to the cabin is Powerbank, which is 32,000mAh with a 5V voltage or 42,000mAh with a voltage of 3.8V.

ISSN: 2622-5778 (online)
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Safety is a major priority in the world of aviation, thus the need for a safety standard that is very optimal by following the existing flight standards. Aviation safety is the overall result of the combination of various factors, namely aircraft, personnel, means of flight, flight operations, and regulatory bodies low. (Jenderal & Udara, n.d.)

Aviation safety stipulated in the legal provisions of the National Indonesia covering Act NO . 1 of 2009 concerning Aviation regulates sovereignty over airspace in Indonesia, violation of sovereignty territory, aircraft production, registration and nationality of aircraft, airworthiness and operation of aircraft, safety and security in aircraft, independence of investigation of aircraft accidents, assembly of assemblies aviation professions, public service providers, in relation to this fact the purpose of the flight itself in accordance with Law Number 15 of 1992 article 3 contains the realization of flights that are safe, secure, fast, smooth, orderly, and orderly, comfortable and efficient with affordable cost. (Damanik, 2014)

Lithium Powerbank belongs to the dangerous goods category and has been explained in Annex 18 and in dangerous goods regulation subsection 2.3, subclass 9 (miscellaneous dangerous goods) in the Chicago Convention and associated technical instructions for safe transport of dangerous goods by water published by ICAO.

Method

This study used correlational research with a quantitative approach that describes a general approach to research that focuses on assessing the variability among variables that appear naturally. Correlational research involves collecting data to determine whether, and to what degree, there is a relationship between two or more quantifiable variables. This research method used a sample of 50 correspondents. Statistical techniques used are descriptive statistics and inferential statistics. (Kiswoyowati, 2011)

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A study can be started with a survey, then purposive sampling is carried out based on a survey (Brown 2005) Purposive sampling can be used with a number of techniques in data collection (Godambe 1982). Robbins et al. (1969) used questionnaires as a systematic way to find information in the study of acculturation. The researchers asked respondents what would show acculturation and carry out their responses through data reduction techniques to determine what qualities acculturated people. (Tongco, 2007)

Purposive stratification samples can also be used, where the appropriate subsample is selected in a purposive sample (Belcher et al. 2006). Key informants have also been used to find purposive samples (Barany 2006). Both random and purposive sampling can also be combined to produce a strong sampling method (Albertin & Nair 2004, Godambe 1982).

There is no limit on how many informants must make a purposive sample, as long as the information needed is obtained (Bernard 2002). Seidler (1974) studied different sample sizes from purposively selected informants and found that at least five informants were needed so that data could be relied on.

This study aims to find out how many aircraft passengers know the regulations regarding to limitation of Powerbank's lithium capacity, to analyze the level of knowledge of passengers about the safety standards of lithium Powerbank usage on aviation. Reviewing whether this regulation has been effective or not to all passengers or prospective passenger aircraft regarding flight safety standards that can be affected by lithium Powerbank.

2.1 The Basic Principle of Correlational Survey Method

According to Gay (1981: 183) correlational research is sometimes treated as descriptive research, mainly due to correlational research describing an existing condition. However, the conditions described in self-reports or observation studies; a correlational study describes, in quantitative terms the degree to which

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variables relate. Correlational research involves collecting data to determine whether, and to what degree, there is a relationship between two or more quantifiable variables. Relationship levels are expressed as a correlation coefficient. The purpose of correlational studies is to determine the relationship between variables, or to use these relationships to make predictions. (Quantitative & Qualitative Education Research Methodology Prof. Dr. Emzir, M.Pd)

2.2 Correlational Survey Method Implementation

This research method uses a sample of 50 correspondents with correlational variables X and Y variables, variable X represents Knowledge of Carrying Lithium Battery to variable Y represents Flight Safety .

If the correlation coefficient for all items has been calculated, it is necessary to determine the smallest number that can be considered "high" enough as an indicator of consistency between the item score and the overall score. In this case there are no strict limits. The main principle of selecting items by looking at the correlation coefficient is to look for the highest possible price coefficients and get rid of any items that have a negative correlation (-) or coefficients that are close to zero (0.00).

According to Friedenberg (1995) in Sugiyono (2008) usually in the development and preparation of psychological scales, the minimum correlation coefficient is equal to 0.30. Thus, all items have a correlation. less than 0.30 can be set aside and the items that will be included in the test tool are items that have a correlation above 0.30 with the understanding that the higher the correlation is close to one (1.00) then the better the consistency (validity) .

Discussion and Result

Based on the results of our research, validity of each variable can be seen below:

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Table 1. Knowledge Of Lithium Powerbank

Items	R count	R table 5% (50)	Note
1	0,440	0,279	VALID
2	0,444	0,279	VALID
3	0,607	0,279	VALID
4	0,619	0,279	VALID
5	0,612	0,279	VALID
6	0,608	0,279	VALID

Table 2. Flight Safety

Items	R count	R table 5% (50)	Note
7	0,594	0,279	VALID
8	0,604	0,279	VALID
9	0,350	0,279	VALID
10	0,369	0,279	VALID
11	0,576	0,279	VALID

From the table 1 and 2 above, we can said that all questionnaire instrument from both variables (X) & (Y) that have been distributed to the respondents are valid because r count is bigger than r table.

Table 3. The Result of Descriptive Statistics

Descriptive Statistics

	Mean	Std. Deviation	N
Knowledge of Lithium Battery	15.3400	3.73953	50
Flight Safety	11.4000	2.34738	50

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Table 4. The Result of Correlations

Correlations

		Knowledge of Lithium Battery	Flight Safety
Knowledge of Lithium Battery	Pearson Correlation	1	.445**
	Sig. (2-tailed)		.001
	N	50	50
Flight Safety	Pearson Correlation	.445**	1
	Sig. (2-tailed)	.001	
	N	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

If the significant value is < 0.05 then there is a correlation between the two variables but instead if the significant value is > 0.05 then there is no correlation between the variables. Based on result of a simple correlation test in the table above, obtained significant data (2-tailed) both of variable are 0.001, so we can conclude that one variable and the other has a relation because of significant value is < 0.05.

The correlation coefficient (R) between knowledge of lithium battery variables (X) and Flight safety (Y) is 0,445. Based on the correlation interpretation guidelines proposed by (sugiyono, 2012), it can be conclude that there is a strong correlation between knowledge of lithium battery variables (X) and flight safety (Y).

Hypothesis

The criteria for determining the hypothesis test are if thit <ttab at df (degree of freedom) = n-1, with a significant α = 0.05 then H0 is accepted by Ha rejected, and if thit> ttab at df = n-1 then H0 is rejected by Ha be accepted. After calculating the mean (mean), then one sample test formula is used to find out

ISSN: 2622-5778 (online)
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whether or not there is a difference in the level of passenger knowledge of the level of flight safety.

Ho: There is no relationship of passenger knowledge to bring Lithium Powebank toFlight Safety

Ha: There is a knowledge relationship of passengers carrying Lithium Powerbank to Flight Safety

Table 5. The Result of T test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Knowledge of Lithium Battery	50	15.3400	3.73953	.52885

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Knowledge of Lithium Battery	29.006	49	.000	15.34000	14.2772	16.4028

The results of the t value calculated using SPSS are 29.006, with a significance number of 0.000 it is smaller than the 0.05 significance. t table for df = 50 - 1 = 49 is 2.009 T table with Thitung value = 29.006> t table = 2.009 then Ha is accepted, that is there is a relationship between knowledge and awareness of passengers carrying Battery Lithium to Flight Safety

From the results of the above hypothesis there is a relation between the influence of knowledge of passengers carrying lithium battery for flight safety because it is in accordance with the results of the hypothesis which shows that the count is greater than the table so that Ho is rejected and Ha is accepted.

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Table 6. The Result of Determination Coefficient R Square

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.445[a]	.198	.181	2.12450

The table above explains the correlation value (R) is 0.445. From the output, coefficient of determination (R square) is 0.198. It means the effect of independent variable (knowledge of lithium battery) to dependent variable (flight Safety) is 19.8% and 80.2% is affected by other factors.

Conclusion and Recommendation

Conclusion

This study shows that passengers know enough about the rules issued in the Circular Letter Number 15 of 2018 stipulated on May 9, 2018 regarding the prohibition of carrying lithium Powerbank into the aircraft to support safe and comfortable flight safety. Passenger knowledge of lithium batteries has a relationship with flight safety. This is clearly evident from the results of the calculation of a strong and unidirectional correlation coefficient, 0.445 and is a relationship, while the coefficient of determination of knowledge of lithium battery with flight safety of 19.8% is a contribution of passenger knowledge of the regulations made about the prohibition of carrying lithium batteries above the limit determined by efforts to achieve flight safety. For the rest of the coefficient of determination is influenced by other factors. Passenger knowledge about lithium battery has a significant effect on flight safety.

Recommendation

Based on the results of the discussion and conclusions of the study, the following are suggested:

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
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a. For the community or users of air transport services should pay attention to the regulations issued by the Ministry of Transportation regarding carrying hazardous lithium-based fuel goods to achieve flight safety.

b. For further research, this research still needs to be followed up by other studies that discuss other types of lithium batteries, and will get better research results than previous studies.

c. For airlines, to be more strict in providing direction and complying with the procedures that have been established.

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ISSN: 2622-5778 (online)
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