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Study on the Safety and Security of Dangerous Goods at Compagnie Africaine d'Aviation: Kinshasa Stopover in the Democratic Republic of Congo

Ngbangu Woza Eric[1], Molongo Mokondande Médard[2], Ngalakpa Ziada Héritier[3], Nzolowa Banze Françis[4], Muhammad Ridwan[5]

[1]*Faculty of Economics and Management, Logistics and Transport Department, University of North Ecuador B.P. 277 Gbadolite, Democratic Republic of Congo.*

[2,3]*University of Gbadolite, Faculty of Agronomic Sciences, Department of Plant Science B. P. 111 Gbadolite, Democratic Republic of Congo.*

[4]*Karawa Higher Pedagogical Institute B.P. Gemena, Democratic Republic of Congo.*

[5]*Universitas Islam Negeri Sumatera Utara, Indonesia*

ericngbangu@gmail.com

Abstract: *The aim of this study is to examine the correct handling of dangerous goods by Compagnie Africaine d'Aviation (CAA), in order to limit the risks that could arise from non-compliance with the rules governing the safety and security of dangerous goods. A mixed-methods approach was adopted, using descriptive, analytical and comparative methods, as well as interview, survey, observation and documentation techniques. Data collection and analysis showed that air transport of hazardous materials or products by Compagnie Africaine d'Aviation, despite the existence of regulatory standards, does not really comply with the minimum provisions set by the International Civil Aviation Organization and the Civil Aviation Authority of the Democratic Republic of Congo in terms of safety and security. A low level of handling of dangerous goods was observed in first position with 60%, followed by a medium level of 30% and a very low level of 10%. In view of this result, it should be pointed out that resources need to be invested in training and capacity building for personnel handling these dangerous products.*

Keywords: *Safety; security; air; transport; goods; Kinshasa; Democratic Republic of Congo.*

I. Introduction

Air transport is a regulated economic activity, encompassing the transport of goods of all kinds, both nationally and internationally. Air transport is characterized by its speed, its level of safety and security, its regularity and its reliability, and represents 5% of goods transported by volume but 40% of goods by value (IATA, 2020).

Air transport is as vital to the lives of individuals and communities as blood is to the human organism; it ensures the development of people, trade and services, and the transmission of thought, the manifestation, scope and regularity of which attest to the health of the social body. During the first phase of prosperity, transport is the main factor of growth, requiring a prior investment that varies from one economic agent to another, as well as various costs that cannot be avoided by its exploitation. The most economically wealthy countries are those that have developed and modernized their transport systems (Brun, 1953 ; BAD, 2020).

Safety and security are key features of air freight. Customers choose this mode of transport for a number of reasons: Firstly, for its speed, even if we have to add pre- and post-transportation times; because it takes days for a cargo ship to cross from one territory to another, but the airplane will connect it for just a few hours; then comes safety and security. Indeed, air transport is well-suited to very fragile or poorly-packaged goods. They therefore

play a key role in air freight transport. It is important that all players in this chain ensure that the goods they transport are perfectly secure, as the slightest failure can have devastating consequences for human life and the environment (Lege, 2008).

In the Democratic Republic of Congo, air transport is much more in demand, as the other networks, notably the road, rail, river and even lake networks set up in colonial times, have become obsolete, and their renewal is becoming an urgent necessity. That's why this study was initiated, to ensure compliance with national and international standards and regulations designed to prevent the sensitive factors faced by dangerous goods, not to mention the risks and dangers they present to people, property and the environment. These regulations apply to aircraft operators, airport managers and shippers (Bisimwa, 2015 ; Itabu, 2017).

The aim of this study is to establish a technique for the correct handling of dangerous goods during transport by the Compagnie Africaine d'Aviation CAA, with the aim of limiting the risks that could arise from non-compliance with safety and security regulations for hazardous products.

II. Review of Literature

2.1. Environment

This study was conducted at Compagnie Africaine d'Aviation, in the provincial city of Kinshasa, Democratic Republic of Congo, over a three-month period. Fly CAA (literally "Compagnie Africaine d'Aviation", usually abbreviated to CAA and marketed under fly CAA) is an airline in the Democratic Republic of Congo, founded in 1991. It resulted from the merger of fly Congo and CAA, and is based at Kinshasa's N'djili international airport.

The geographical coordinates of the city of Kinshasa are as follows: Latitude South 4° 23' 28"; Longitude East 15° 21' 12"; Altitude: 282 m (CAID, 2020).

Head office: route des poids lourds n° 1, quartier Kingabwa, commune de Limété, Kinshasa-Democratic Republic of Congo; not far from pont Matété. On the way to the town hall, it is located between the SAFGAZ and SAFRICAS headquarters. Its concession covers an area of around 3,000 m^2.

2.2 Equipment

The materials used in this study consisted of dangerous goods and the survey questionnaire.

III. Research Method

A mixed-methods approach was adopted for this study, using descriptive, analytical and comparative methods. Interview, survey, observation and documentary techniques were used. For financial reasons, 50 respondents were indexed and numbered, but 30 were selected at random to avoid subjectivity.

Observations and surveys focused on :

- The level of screening on acceptance: physical search; identification; hazard analysis; classification using the IATA manual ;
- The level of processing for shipment: packaging; marking and labeling; documentation; handling. Using IATA manuals, conventions and protocols ;
- Level of personal protective equipment: gloves; goggles; muffs; boots; uniforms ;
- Level of training.

For the statistical method, the data were tabulated and processed using Excel 2016 software; arithmetic averages were obtained.

III. Results and Discussion

3.1 Control level

The level of control was taken on the basis of a survey and the result is shown in graph 1.

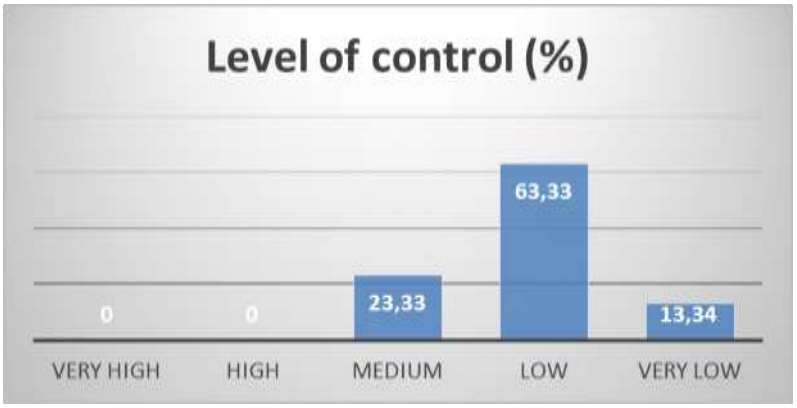

Figure 1. *Distribution of respondents by level of control.*

This study shows that the level of control of hazardous products at Compagnie Africaine d'Aviation escale de Kinshasa was 63.33% for the low level, 23.33% for the medium level, 13.34% for the very low level and 0% for the high and very high levels.

3.2 Treatment level

The level of treatment is shown in figure 2.

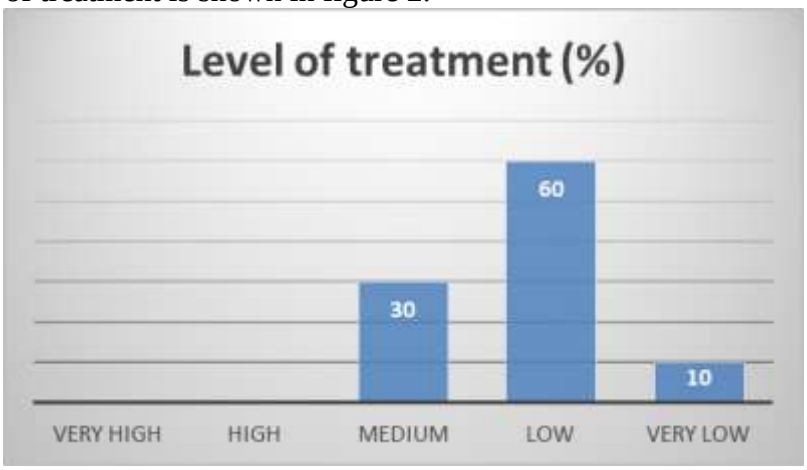

Figure 2. *Distribution of respondents by treatment level.*

Study of this graph places the low level of dangerous goods treatment in first place with 60%, followed by medium level 30% and very low level 10%.

3.3 Level of personal protective equipment

The level of personal protective equipment is recorded in figure 3.

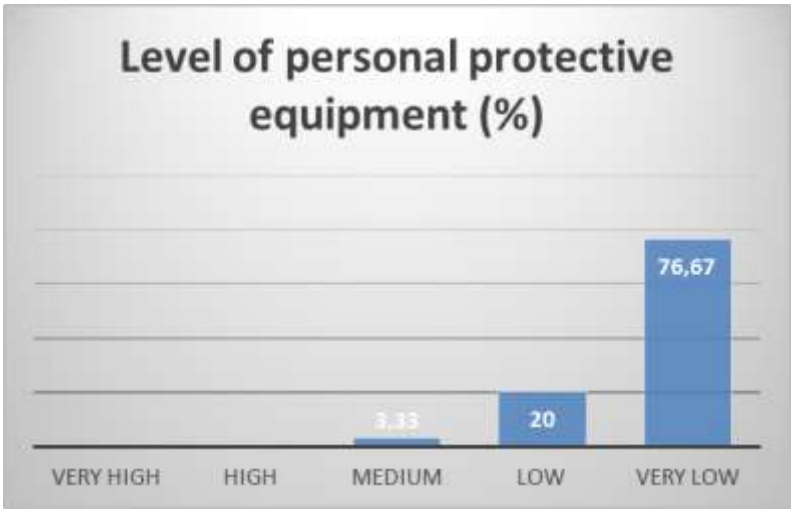

Figure 3. *Distribution of respondents by level of personal protective equipment.*

Analysis of this graph also shows that the very low level of personal protective equipment is in first place with 76.67%. Low and medium levels follow with 20% and 3.33% respectively.

3.4 Level of training by occupational category

The level of training by occupational category is shown in figure 4.

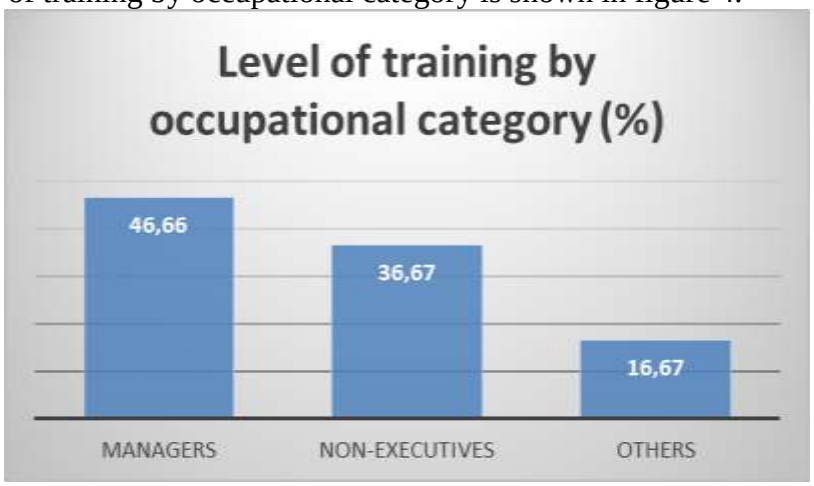

Figure 4. *Distribution of respondents by level of education by occupational category.*

Figure 4 shows that managers are much more highly educated than non-managers and others. With 46.66% of respondents against 36.67% of non-managers and 16.67% of others.

3.5 Level of control

This low level of control is due to the fact that the agents handling the products are not equipped with the appropriate tools to carry out their tasks. While IATA conventions, protocols and instructions recommend the need for equipment such as scanners, toxic gas detectors and heat detectors, the lack of these is the bottleneck that makes work less efficient. It was observed that the level of control of hazardous products is low contrary to the OICI regulatory provision which stipulates that all packages transported by air must imperatively undergo a security operation; obtaining a security certificate to allow boarding (Miami and Venturelli, 2017).

3.6 Processing level

A low level of processing has been noted with regard to the identification, packaging, labelling and handling of hazardous products; this situation is justified by the lack of professional packers and packaging for each class of product, collaboration with other structures that organize professional packaging such as DHL, and failure to observe safety pictograms during handling.

Contrary to the technical instructions, which recommend the use of good quality, carefully sealed packaging and labels for each class or type of hazard, to withstand the conditions to which they may be exposed, such as changes in temperature, humidity, pressure, vibration, shocks, etc., the technical instructions recommend the use of other professional packers. Where necessary, the instructions recommend that we use other professional packers. Each dangerous goods package will bear a mark indicating the official designation of its contents and, where applicable, the UN number, as well as any other marks (ICAO, 2011).

The UN number is chosen according to the nature of the products to be transported, the mode of transport used, the duration of the transport, the means of handling at departure and arrival, and the requirements of the shipping department, the carrier and the consignee (Alonso, 2015).

3.7 Level of personal protective equipment

Personal protective equipment has been found to be at a very low level. The main reason for this very low level is that product handlers are not equipped. This equipment is essential to employee safety when handling harmful substances. As a minimum, workers should have gloves, boots, muffs, eye protection and overalls. This equipment is strongly recommended. From the above, our results show that most of the aviation agencies in the Democratic Republic of Congo run counter to a certain provision of the ILO (1993), according to which The criteria established should be compatible with those of the regulations in force for international transport, notably the International Maritime Code for the Carriage of Dangerous Goods, the Convention on International Civil Aviation and, in Europe, the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR); which apply to goods crossing borders, and are primarily designed to protect the environment and people other than transport workers, who may be involved in transport accidents.

3.8 Level of staff training

Any person in charge of acceptance, storage or dispatch must receive the necessary instructions concerning the hazards to which they are exposed and the precautions to be taken (Lege, 2008).

An average level of training was observed much more among managers, followed by non-managers. Others, on the other hand, who are more in direct contact with products, are less well trained. While the two decrees of December 18, 2003 specify that everyone involved in air transport is concerned by security and must undergo continuous training (Miani and Venturelli, 2017).

AfDB (2020) notes that human capital is an essential driver of economic growth through its effect on productivity. Overall, the role of education in increasing productivity has been relatively limited in Africa. This is partly due to the low quality of education, the lack of complementarity of physical capital and the frequent mismatch between skills and education. Investing in the quality of education can therefore increase the productivity of Africa's workforce and businesses.

IV. Conclusion

This study was initiated to assess the level of air safety and security of dangerous goods at Compagnie Africaine d'Aviation.

The results show that the air transport of dangerous goods by Compagnie Africaine d'Aviation, despite the existence of regulatory standards, does not really comply with the minimum provisions set by the International Civil Aviation Organization and by the Civil Aviation Authority of the Democratic Republic of Congo, in terms of safety and security, although average results have been achieved thanks to the involvement of the safety and security management in training.

The main difficulty lies not only in the lack of equipment or tools, but also in the implementation of a policy of development and unprecedented sharing of information on the dangers and risks presented by these dangerous goods. This represents a major challenge for companies operating in this field, particularly CAA.

In today's competitive environment, the slightest error can be fatal. Insofar as this imposes rules, procedures, standards or compliance with processes that involve aviation companies in major tasks.

So, to improve the level of air safety and security for dangerous goods:

- Organize, with the relevant departments and approved organizations, the training of teams responsible for fire-fighting and ensuring compliance with aviation safety and security instructions ;
- Develop safety reflexes among employees, and gather suggestions from them to help improve airport safety conditions ;
- Improving the information system: informing all those involved by providing them with leaflets describing dangerous or prohibited objects ;
- Involve sales staff in the information system: they play an important role in the chain because they are in direct contact with the customers they are responsible for welcoming, so they are aware of the risks and dangers ;
- Strengthen everyone's skills through training adapted to each activity ;
- Provide workers with appropriate tools and PPE, and offer training in handling hazardous substances.

Each of the measures presented in this article has an essential role to play, not only in guaranteeing aviation safety and security, but also in opening the door to a response to the fierce competition faced by airlines.

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