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The Global Impact of Improving Aviation Safety in Africa

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Aviation safety has been a pillar of the aviation industry since the early 20th century when the Wright brothers made their historic maiden flight. Air transport has increased exponentially since then, with tons of cargo and millions of passengers moving monthly around the world. This increase in flights has made it imperative to reduce the number of accidents and incidents and to achieve the same level of aviation safety worldwide, but that has not been the case in Africa. Organizations like the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) have fostered aviation safety since the 1940s. More recently, in 2001, ICAO published Annex 19 on Safety Management, which provides standards and recommended practices under the safety management system (SMS) and the state safety program (SSP). In January 2018, the African Union launched the Single African Air Transport Market (SAATM), which presents a great opportunity for the improvement of aviation safety in Africa. Based on data from various aviation organizations and on-the-ground experiences in the past decade spearheading many aviation projects in Africa, the author, a 30-year aviation veteran with expertise in aviation safety, provides a fresh analysis of the state of aviation safety on this vast and rich continent of 54 countries. Key issues and practical solutions to those issues are presented while highlighting the global interconnectivity of aviation safety with the goal of enhancing the efforts of the various stakeholders working to raise the level of aviation safety in Africa.

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Introduction

Aviation safety has been a pillar of the aviation industry since the early 20th century when the Wright brothers made their historic maiden flight. Air transport has increased exponentially since then, with tons of cargo and millions of passengers moving monthly around the world. This increase in flights has made it imperative to reduce the number of accidents and incidents and to achieve the same level of aviation safety worldwide. But the level of aviation safety seen in Europe or North America, for instance, is not observed in Africa despite a significant percentage of goods and persons being transported in and out of Africa worldwide.

Organizations like the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) have fostered aviation safety since the 1940s. In 2001, ICAO published Annex 19 on Safety Management, which provided standards and recommended practices under the Safety Management System (SMS) and the State Safety Program (SSP). The IATA Operational Safety Audit (lOSA) launched by IATA in 2001 was designed to assess the operational management and control systems of an airline with safety improvement as a backdrop.

Even the U.S. government back in 2009 launched some initiatives (U.S. Government Accountability Office (GAO), 2009): « Recognizing the importance of improving aviation safety in Africa, the United States and the international aviation community have worked to improve aviation safety in Africa. This congressionally requested report discusses (1) challenges in improving aviation safety in Africa, (2) key U.S. efforts to improve aviation safety in Africa and the extent to which they address the identified challenges, and (3) international efforts to improve aviation safety in Africa. To address these issues, GAO synthesized literature and aviation safety data, interviewed federal officials, and visited four African countries.»

Life-threatening events like air transport incidents and accidents that happen in one part of the world affect the entire world because passengers are of different backgrounds (business people, diplomats, tourists) and of different nationalities. Africa is comprised of 54 countries, and passengers fly from one African city to another and inside the same country as well as to and from African cities to destinations worldwide on board African airlines and international airlines. It is, therefore, evident that improving aviation safety in Africa is a global matter that needs continuous focus with frequent meetings similar to the one organized in 2007 by the Flight Safety Foundation (Flight Safety Foundation, January 30, 2007).

Figure 1
Some Aviation Safety Numbers (based on data from IATA)

Aviation Safety in Africa in Numbers (IATA 2022)

Airline companies in Africa: Approx. 700 in 54 countries

Accident rate in Africa: 8.76 per million sectors

Accident rate worldwide: 1.21 per million sectors

The worldwide accident rate means that overall, there is one accident for every 826.088 flights; or that a person taking one flight every day would need to fly for 2,263 years before experiencing an accident. (IATA Annual Safety Report, 2022 - Executive Summary and Safety Overview Edition 59)

The following new analysis comes from a 30-year aviation veteran who has worked on various continents and has in-depth knowledge of African aviation. The analysis highlights the global interconnectivity of aviation safety, provides valuable information about the state of aviation safety in Africa and its impact on the aviation safety level worldwide, identifies some of the key issues, and provides practical solutions to those issues in order to raise the level of aviation safety in Africa.

Methodology

This analysis was enhanced by internet queries based on data obtained from the following organizations: International Civil Aviation Organization (ICAO), International Air Transport Association (IATA), Federal Aviation Administration (FAA), European Union Aviation Safety Agency (EASA), African Airlines Association (AFRAA), African Development Bank Group (AfDB), and Civil Aviation Authority Agencies of some African countries.

Limitations

There were limitations to this analysis, such as Difficulties in obtaining information from civil aviation authorities, consistency of data, accuracy and veracity of some data, taxonomy not agreed upon for some databases, and difficulties in navigating multiple databases.

Key aviation safety issues in Africa

There has been a new impetus in the past decades to improve aviation safety in Africa. As Shila and Anne (2015) said, «Aviation safety implementation in the African region is essential as air transport is expected to play a key part in the region's economic growth through a variety of means such as the transportation of passengers and cargo to and from the region.»

Issues arise at two levels: at the level of civil aviation authorities and at the level of the industry, namely airline operators and service providers.

A) Issues at the level of Civil Aviation Authorities:

They are of multiple origins.

Inconsistent implementation of the ICAO Standards and Recommended Practices (SARs): This inconsistency is reflected in the absence of clear aviation laws that organize civil aviation and define the powers of the civil aviation authority in terms of regulation, supervision, and enforcement. This legislative weakness leads to the absence of national aviation regulations that comply with the standards and recommended practices of ICAO, the governing body for both international and domestic flights.

Reduced regulatory oversight of civil aviation authorities: The decrease in oversight is primarily due to the lack of financial, logistical, and human resources to supervise aviation industry activities. Civil aviation inspectors are financially and logistically limited to conducting oversight activities, which are central to maintaining high safety levels in a state's aviation industry.

*Inconsistent continued education and training of Civil Aviation Inspector*s: Some civil aviation inspectors are not up-to-date with their training and are limited to conducting effective inspections of aircraft and assessment of pilot qualifications, for instance.

Lack of an accident investigation office for the continent and lack of modern equipment to conduct serious accident/incident investigations: Civil aviation authorities do not always have an investigation office with trained inspectors who can probe incidents and accidents and draw safety conclusions to be used to improve the safety level and decrease incidents and accidents. *Insufficient airport infrastructure and supervision of airport subcontractors and lack of primary and secondary radars for air traffic controllers*: The aerodromes and control towers are insufficiently equipped. Also, primary or secondary radar and security around the runways, such as adequate fencing, are lacking, which results in numerous runway incursions. These safety issues pose a risk to aircraft and passengers as well as to the local populations who often find themselves in traffic areas.

Inconsistent weather forecasting: There is an insufficiency of funding and qualified personnel for weather services and forecasting from civil aviation agencies. Weather reports are sometimes not from approved sites.

B) Issues at the level of the aviation industry

The main issues with industry entities like airline operators and service providers that hamper the improvement of aviation safety are the following:

Non-compliance with the complete airline certification process as per ICAO Annexes and Doc 8335: Airline operators don't always undergo the complete certification process, which leads to a frequent use of derogations. Some domestic airline companies do not have an Air Transport Certificate (ATC) and operate under derogation regimes that reduce safety margins.

Industry visits organized as part of ICAO's USOAP audits have demonstrated inconsistent compliance with regulatory requirements from several African airline companies.

Inconsistent follow-up in maintaining crew member competency: The lockdowns caused by the COVID-19 pandemic have negatively impacted the flight status of pilots with regard to their maintenance of competence and recent experience. The difficulties of travel to the simulators have resulted in exemption regimes, which are unfortunately becoming the rule. For instance, we still observe cases of pilots who have not carried out the regulatory exercises in the simulator since the end of the pandemic was declared.

Difficulties in maintaining aircraft: Some airlines cannot keep up with scheduled maintenance. Maintenance checks are sometimes delayed for financial reasons, and spare parts are difficult to source. The maintenance program recommended by the manufacturer and approved by civil aviation authorities is implemented to varied degrees. Airlines facing serious financial difficulties seek to survive by making savings in maintenance costs. For example, some equipment on the MEL (Minimum Equipment List) would remain out of order beyond the regulatory deadlines, and some aircraft are not equipped in accordance with their type of operation, such as the lack of ELT (Emergency Locator Transmitter) or GPWS (Ground Proximity Warning System).

The dearth of operational fundamentals in the organizational structure of airline operators: The accountable managers are often appointed and lack technical qualifications to occupy positions that involve aviation safety responsibilities. In addition, airlines have not implemented a positive safety culture inspired by the Safety Management System (SMS) and the aviation industry's safety strategies and best practices.

Aging fleets: aircraft are usually twice as old on average compared to Europe or the USA. There is a lack of modern aircraft in the fleet of many African airline operators. Apart from the fleet of two or three African airline operators, aircraft usually are two or three times older on average than aircraft of airline operators in Europe or the United States. The aging fleets lead to very high maintenance costs, with airline operators in Africa incurring elevated costs to bring their fleets up to international standards to comply with noise abatement or CO_2 pollution requirements.

Expensive security deposits are required for transactions with African airline operators, and insufficient cash flow is affecting the sustainability of operations, especially after the COVID-19 pandemic. Several African airline companies have very tight financial accounts. There is no maintenance reserve, and spare parts are purchased only after the aircraft breaks down. The steering wheel of spare maintenance parts such as wheels and consumables is minimal. Vendors or resellers of spare parts take advantage of this situation to overvalue the parts when aircraft are in « Aircraft On Ground » (AOG) status. Even burst tires during a domestic flight can interrupt operations for several days.

Portfolio diversification: Airlines doing cargo and passenger operations fared better during economic downturns. The business model of many airline operators is similar to that of

non-aviation businesses, which is an unsustainable practice due to the fact that reserves are not built up while funds are used for current expenses such as spare parts, fuels, rent, and salaries.

Proposed solutions for the improvement of aviation safety in Africa

Tangible improvement in aviation safety in Africa can be achieved if simultaneous and synergistic progress occurs simultaneously at the level of the civil aviation authorities of African countries and at the level of the industry's airline operators and service providers, with the establishment of clear performance indicators and solution-driven safety culture at the core of all actions.

Given that air transport involves cross-continental flights in addition to domestic flights, improvement of aviation safety in Africa must also include continental initiatives as well as regional and national initiatives. Drawing from the author's intercontinental aviation experience and expertise in aviation safety through projects led in Africa, the following proposals can help raise aviation safety level in Africa:

Establishment of an African continental safety body: This body will a) issue harmonized aviation standards for African countries almost similar to the European Union Aviation Safety Agency (EASA), b) enhance the efficiency of the work of existing regional African safety bodies, which are under-staffed and lacking funds and c) with support from aviation entities like the Federal Aviation Administration (FAA), EASA, and the Flight Safety Foundation in terms of training, logistics and On-the-Job Training (OJT) make a huge difference.

The newly established continental safety body will draft a common regulation that will make possible regional supervision and facilitate the implementation of the single market of air transport in Africa. It will harmonize the work of the existing regional African safety bodies. Some initiatives are currently underway, such as Cooperative Development of Operational Safety and Continuing Airworthiness Programme (COSCAP), Agency for Aerial Navigation Safety in Africa (ASECNA) and Autorités Africaines et Malgache de l'Aviation Civile (AAMAC – Civil Aviation Authorities from Africa and Madagascar), but the recurring problem is the financial viability of these structures that remain fragile because they depend on the contributions of Member States.

As with the EASA, the continental safety body would not replace the States' civil aviation authorities but have a precise mandate in certain domains, such as safety supervision, by mutualizing the existing resources. The regional offices of ICAO, African Civil Aviation Commission (AFCAC), and IATA, through their Global Aviation Safety Plan (GASP) or IOSA, for instance, could provide technical support to this newly-formed African aviation safety body that will not take away the States' sovereign authority.

Continuous capacity building for Civil Aviation Inspectors: The proposed Continental Safety Body would be responsible for training inspectors who will work at the continental and state level. Training records will be kept at the continental level, and each inspector will be evaluated annually. Wages and working conditions will be harmonized as a great incentive for inspectors.

*Development of airport infrastructure and acquisition of ground equipment***:** African countries should increase the budget allocated for the development of airport infrastructures and ground support equipment (control towers, primary and secondary radars, firefighting, search and rescue equipment, emergency response plan kits). The African Development Bank Group (AfDB), which finances numerous airport infrastructure projects in Africa, should involve local communities in the environmental sustainability and long-term viability of these infrastructures. Networking partnerships and twinning arrangements between African airports and USA airports are recommended as they will ease the implementation of high-level security procedures in African airports. Some twinning agreements are in progress and should be expanded to allow more airports in Africa to undergo the FAA's Category 1 Assessment.

Organizational restructuring of African airlines: Focus must be placed on the restoration of the operational foundations. It requires a) effective implementation of Safety Management Systems (SMS) while relying on a new solution-driven safety culture based on self-reporting as well as proactive and predictive approaches to address operational risks, b) integration of the IATA Operational Safety Audit (IOSA) Program as a baseline for the safety level for airline operators and c) promotion of networking and code-shares agreements between airlines in the USA and Africa and sharing of safety best practices. In abiding by aviation regulations as a baseline for safety, airlines will be able to add safety performance indicators to their compliance checklist. Safety performance can be achieved through the implementation of Flight Data Analysis (FDA), Flight Operational Quality Assurance (FOQA), Runway Excursion Risk Reduction (RERR) tool kit, and Control Flight into Terrain (CFIT) prevention measures, for instance.

Modernization of airline fleets: This can be achieved by changing the practice of aircraft lessors using prohibitive leasing conditions and criteria based on "country risk level." Currently, the waiting time for new aircraft delivery is four to five (4-5) years for many African airlines. Reducing costs of new aircraft and spare parts and excessive acquisition delays would be very helpful. The African Development Bank is setting up a purchasing platform for aircraft and spare parts, and manufacturers and spare parts brokers should support this initiative. New communication, navigation, and search and rescue requirements (per ICAO Annexes) call for new equipment, and for older fleets, it is very costly to bring up to Airworthiness Directives (AD) standards.

Adoption of efficient financial model for airline companies: Implement secure, effective, and cost-efficient financial services and adoption of modern retailing standards (usage of Artificial Intelligence (AI)). Implement airline financial management training for airline staff. Allow flexible repayment terms and set up maintenance reserves.

Implementation of a continental aviation single market: There are existing initiatives for integrating regional aviation markets in Africa that can mutualize resources, which will foster the improvement of aviation safety. There must be an enhancement of air connectivity and boosting of economic growth across the African continent. An increase in competition that leads to lower airfares, improved services, and greater choices for travelers in Africa is beneficial. There should be facilitation of travel for tourists, domestic and international, as well as a maximization of the

efficiency of SAATM (Single African Air Transport Market), a project of the African Union Agenda 2063, by involving African aviation safety experts. More positive actions include reduction of transportation costs, enhancement of supply chain efficiency, promotion of intra-African trade, regional infrastructure development, integration and unity, and promotion of environmental sustainability to achieve the "Net Zero by 2050" emission targets agreed to by industry and the UN's International Civil Aviation Organization (ICAO) member states.

Conclusion

The world has become a "small village" thanks to the easy movement of persons and goods. Improving aviation safety in Africa is feasible and involves global actions, reflected by the African proverb that "a bundle cannot be fastened with one hand." Air transport incidents and accidents that happen in one part of the world affect the entire world, given the various nationalities of passengers.

As Cox (2018) said in USA TODAY, «African aviation has some challenges. Some operators use older airplanes, and the maintenance is not up to global standards. The environment can be problematic, and some airports on the continent lack good infrastructure. These elements, in combination, result in a higher accident rate than in other parts of the world. Despite these challenges, aviation safety in Africa has improved over the years. There are some very dedicated safety professionals at work continuing the improvements. Overall, I would say that aviation in Africa is improving, but significant challenges remain. High-quality operators and regulators working together can make a big difference.» Certainly, the improvement of aviation safety in Africa is a matter of personal, national, continental, and diaspora pride for African stakeholders while also being a global endeavor of interest to the entire world.

The Single African Air Transport Market (SAATM) is a key step towards unlocking Africa's economic potential and improving safe connectivity both within the continent and with the rest of the world. As reported in Aviation Pros (2020), "The International Air Transport Association (IATA) and African Airlines Association (AFRAA) have joined forces with the African Civil Aviation Commission (AFCAC) on a three-year safety project. The objective is to provide technical support to the African air operators of states party to the Single Africa Air Transport Market (SAATM) to ensure that they achieve and maintain global aviation safety standards. The initiative is backed by African Development Bank grant funding provided to AFCAC and is specifically for carriers in countries that have signed up to the African Union's (AU) flagship Single African Air Transport Market (SAATM) program. The project will identify eligible airlines, conduct gap analyses, and recommend corrective actions for each participating carrier to prepare them for IATA Operational Safety Audits (IOSA) or IATA Standard Safety Assessment (ISSA) evaluation." Such initiatives would benefit from enlisting aviation safety experts from Africa, Europe, and the USA gathered in a task force aimed at maintaining the momentum for maximum impact.

Cox (2018) rightfully recognized two high-performing African airline operators when he said, "There are many good airlines operating in Africa, to name two: South African Airways and Ethiopian Airlines. I know pilots from both of these airlines, and both are committed to safety. Statistically, both of these airlines are on par with other global operators and are highly

respected." Consequently, improving aviation safety in Africa means having more African airline operators with the same level of safety as South Africa Airways and Ethiopian Airlines. Also, having more aviation safety experts from Africa, like the author, involved in global and continental initiatives is vital.

Aviation safety in Africa is a hot topic, as the address from IATA's Regional Vice President for Africa & Middle East, Mr Kamil Alwadhi, at the Aviation Africa 2022 Summit in Kigali, Rwanda shows (Business and Financial Times Online, September 27, 2022). The author has been passionate about aviation safety in Africa for more than a decade, has worked on many improvement projects on the continent, and believes that it is possible to improve aviation safety in Africa by following the steps in the aforementioned analysis. The author hereby offers time and expertise for projects aiming at raising the level of aviation safety in Africa because the global interconnectivity of the issue means the entire world benefits when the level of aviation safety in Africa improves.

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