Assessment of Safety Management System (SMS) Effectiveness in Small Commercial Airlines in The Philippines

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***ABSTRACT**-The aviation industry places paramount importance on safety, and the implementation of a robust Safety Management System (SMS) is a critical component in achieving this objective. In compliance with ICAO Annex 19, all aviation service providers, including small commercial airlines, are required to establish and maintain an effective SMS. However, in the Philippines, many small commercial airlines face persistent challenges in fully implementing and sustaining these systems due to limitations in resources, workforce capacity, infrastructure, and organizational safety culture. This research aims to evaluate the effectiveness of SMS in small Philippine carriers, with particular attention to three critical dimensions: hazard reporting practices, risk management procedures, and safety culture maturity. To achieve this, a mixed-methods approach was employed. Quantitative data were gathered through structured surveys aligned with ICAO's safety performance indicators, while qualitative data were obtained via semi-structured interviews and document reviews. Respondents included safety managers, line safety officers, flight crew, and ground personnel across multiple operational departments. The study also assessed the alignment of each organization's SMS documentation—including manuals, hazard logs, and audit reports—with ICAO standards and local regulatory requirements under PCAR Part 9. The results revealed that while most airlines have an SMS framework in place, its application is often inconsistent and superficial. Only 58% of personnel reported engaging in regular hazard reporting, with many citing fear of punitive action, lack of feedback, and insufficient leadership support as primary barriers. Risk management activities were generally reactive, conducted only after incidents, rather than proactively as part of day-to-day operations. Furthermore, the safety culture across these organizations was found to be in the early stages of maturity, with limited evidence of just culture, peer accountability, or ongoing safety promotion. These findings highlight the urgent need for targeted interventions, including safety leadership development, consistent training, digital hazard reporting tools, and the reinforcement of non-punitive reporting environments. The study concludes by proposing strategic recommendations to enhance SMS effectiveness, including localized manual revisions, structured audit follow-up systems, and increased integration of safety officers in operational functions. By addressing both systemic and cultural issues, small airlines in the Philippines can improve their compliance with ICAO standards and, more importantly, establish a proactive and sustainable safety culture.*

I. THE PROBLEM AND ITS BACKGROUND

1.1 Background of the Study

In the aviation industry, safety is a paramount concern that underpins all operational activities. To institutionalize safety practices across aviation service providers, the International Civil Aviation Organization (ICAO) mandated the implementation of Safety Management Systems (SMS) through Annex 19. SMS provides a structured framework for identifying hazards, managing risks, ensuring compliance, and promoting a proactive safety culture (ICAO, 2018). Its four key components—safety policy and objectives, safety risk management, safety

assurance, and safety promotion—are designed to ensure continuous safety improvement.

While large airlines often have dedicated safety departments and robust infrastructures to support SMS implementation, small commercial airlines face more significant challenges. These include limited financial and human resources, lack of specialized training, and weak organizational support for safety initiatives (Stolzer et al., 2010). In the Philippine context, many small carriers operate with lean teams and informal safety procedures that fall short of full SMS compliance. revealed that the absence of just culture, digital tools, and updated manuals hampers effective safety performance among these operators.

Furthermore, safety culture—the shared values, beliefs, and norms about safety in an organization—plays a critical role in SMS effectiveness. According to Wiegmann et al. (2004), the maturity of an organization's safety culture determines whether safety reporting is proactive or suppressed by fear of blame. This is particularly relevant for small operators, where staff often hold multiple roles and where hierarchical or cultural barriers may discourage open communication (Hudson, 2001).

Given these challenges, assessing the effectiveness of SMS in small Philippine airlines is both timely and essential. Such assessment can identify procedural and cultural gaps, help tailor safety interventions to their operational context, and guide regulators and operators in strengthening aviation safety across the sector.

1.2 Objectives of the Study
The study aims to:
- Assess the effectiveness of SMS implementation in small Philippine commercial airlines.
- Evaluate the level of hazard identification and reporting across departments.
- Examine risk management practices and safety communication processes.
- Measure the maturity of safety culture using ICAO-aligned metrics.
- Propose strategies to align SMS practices with international aviation standards.

1.3 Significance of the Study
This research will benefit aviation safety practitioners, airline management teams, and regulators (e.g., CAAP) by providing empirical data and targeted recommendations. It emphasizes the importance of institutionalizing safety as a core organizational value, even within resource-limited environments.

II. METHODOLOGY

Research Design: The study uses a sequential mixed-methods approach. Quantitative data is collected via structured surveys based on ICAO SMS indicators. Qualitative insights are drawn from in-depth interviews and document reviews.

Locale:
The research was conducted across selected small commercial airlines operating under domestic Air Operator Certificates (AOCs). Participants included:
- Safety Managers and Line Safety Officers (LSOs)
- Pilots and Flight Attendants
- Ground Operations Personnel (Ramp, Maintenance, Dispatch)

Data Collection Tools
1. Survey Instrument: Focused on safety performance indicators, reporting culture, and risk mitigation practices.
2. Interview Guide: Semi-structured questions addressed safety communication, barriers to SMS effectiveness, and organizational safety attitudes.
3. Document Review Checklist: Evaluated SMS manuals, hazard logs, and internal audit reports for alignment with ICAO's four SMS components.

Data Analysis
The data collected from surveys, interviews, and documents were analyzed in a straightforward way to understand how SMS is working in small airlines.

- Survey Results were summarized using basic statistics like percentages and averages. For example, we looked at how many people report safety issues and how often safety meetings

happen. This helped us measure SMS effectiveness based on real experiences of staff.

- Interview Responses were grouped by common answers or recurring themes. For example, if many participants said they were afraid to report hazards, we treated this as a key finding. We did not use complex software—just manual grouping and analysis of answers.
- Document Review was done by checking if SMS-related documents (like hazard logs and safety manuals) match ICAO's required components. We also looked for missing or outdated parts in the records.

III. RESULTS AND DISCUSSION

3.1 Survey Results
- Only 58% of personnel consistently report hazards, citing lack of feedback and fear of blame.
- Risk assessments were often conducted post-incident rather than proactively.

3.2 Interview Themes
- Safety Leadership Gap: Line managers often unaware of SMS procedures or do not model safety behavior.
- Cultural Barriers: Staff often hesitant to report near-misses due to fear of punitive action.
- Training Needs: Inconsistent understanding of risk controls and safety responsibilities.
- Positive Insights: Airlines with Safety Officers embedded in daily operations showed higher compliance and staff engagement.

3.3 Document Review
- SMS Manuals exist but are not consistently updated or contextualized for daily use.
- Hazard Logs lacked categorization and risk scoring.
- Audit Reports had recurring issues unaddressed over multiple cycles.

IV. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

4.1 Summary of Findings
- SMS effectiveness in small commercial airlines remains limited due to cultural, procedural, and resource-related challenges.
- Hazard reporting is underutilized, and risk management is mostly reactive.
- There is a general lack of structured safety culture development initiatives.

4.2 Conclusions
Small commercial airlines in the Philippines show varying levels of SMS maturity, with many operating at basic compliance levels rather than proactive safety promotion. While ICAO standards are recognized, their implementation is often superficial. Bridging this gap requires leadership commitment, operational integration, and investment in training and systems.

4.3 Recommendations
- Safety Promotion & Just Culture Implement non-punitive reporting policies to foster open communication and trust.
- Regular SMS Training Conduct periodic training sessions for all departments, customized to operational roles.
- Integrated Hazard Logging Tools Digitize hazard reports with risk scoring features for trend analysis and accountability.
- Audit Follow-up System Strengthen post-audit corrective action tracking and regular management reviews.
- SMS Manual Revision and Localization Customize and update manuals for relevance to specific operational contexts.

REFERENCES

[1] ICAO. (2018). Annex 19 International Civil Aviation Organization – Safety Management.

[2] PCAR Part 9 Civil Aviation Authority of the Philippines (CAAP). IS 9.7.1.2 (a) SAFETY MANAGEMENT SYSTEM

[3] Wiegmann, D. A., Zhang, H., von Thaden, T. L., Sharma, G., & Mitchell, A. A. (2004). A synthesis of safety culture and safety climate research. Aviation Research Lab, University of Illinois.

[4] Tuazon, R. & Morales, J. (2020). Safety culture maturity in small Philippine air carriers. Philippine Journal of Aviation and Transportation, 4(1), 12–24.

[5] Stolzer, A. J., Halford, C. D., & Goglia, J. J. (2010). Safety Management Systems in Aviation. Ashgate Publishing.

[6] Hudson, P. (2001). Safety culture – the way ahead? Theory and practice in risk assessment. Journal of Hazardous Materials, 86(1–3), 1–10.

[7] Piers, M., Montijn, C., & van der Vries, P. (2009). A practical approach to a just culture. European Transport Safety Council.

[8] Gibbons, A. M., von Thaden, T. L., & Wiegmann, D. A. (2006). Development and validation of a safety culture survey for commercial aviation. Federal Aviation Administration.

[9] Reason, J. (1997). Managing the Risks of Organizational Accidents. Ashgate Publishing.

[10] Hawkins, F. H. (1993). Human Factors in Flight (2nd ed.). Aldershot: Avebury Technical.

[11] Edkins, G., & Pollock, C. (1997). The influence of safety climate on safety performance in rail operations. Ergonomics, 40(3), 328–336.

[12] Dekker, S. (2014). The Field Guide to Understanding 'Human Error' (3rd ed.). CRC Press.