Proc. of the European Safety and Reliability Conference (ESREL 2026)
Edited by José C. Matos, Paulo B. Lourenço, Michael Beer, Daniel Oliveira,
Edoardo Patelli, Hélder S. Sousa, Rui A. Silva and Monica Santamaria
© 2026 ESREL 2026 Organizers. *Published by* Research Publishing, Singapore.
doi: 10.3850/ESREL2026061419_esrel26-p26174-cd

The Application of Resilience Engineering (RE) in Aviation MRO: A Systematic Literature Review and Conceptual Synthesis

Jose Pereira

Engineering Centre, Petropolis Catholic University, Petropolis, Brazil. E-mail: josecristiano.pereira@ucp.br

Flavio Frade

Engineering Centre, Petropolis Catholic University, Petropolis, Brazil. E-mail: flavio.frade@ucp.br

Flavio Almeida

Engineering Centre, Petropolis Catholic University, Petropolis, Brazil. E-mail: flavio.book@gmail.com

Francisco Andrade

ITE Recreio Inst.de Tecnologia e Ensino, Rio de Janeiro, RJ, Brazil. E-mail: francisco.andrade@fanpec.com.br

Fábio Esperança

Engineering Centre, Petropolis Catholic University, Petropolis, Brazil. E-mail: flavio.book@gmail.com

The Maintenance, Repair, and Overhaul (MRO) of jet engines is a complex, high-reliability domain where safety management has traditionally been governed by reactive, Safety-I principles. However, the increasing complexity of socio-technical systems and the limitations of linear risk models in addressing performance variability and unforeseen events have prompted calls for a paradigm shift. This paper presents a systematic literature review that maps and synthesizes the emerging body of knowledge on the application of RE within aviation MRO. The review methodology follows a structured process to identify, select, and critically appraise relevant academic and industry literature. The analysis reveals that current research is nascent but evolving rapidly. Key themes identified include: (1) the conceptual argument for RE as a necessary complement to traditional risk assessment, moving focus from failure prevention to the understanding of successful performance adaptations; (2) the identification of latent resilience capabilities—anticipating, monitoring, responding, and learning—within established MRO practices like Prognostics and Health Management (PHM) and human factors analysis; and (3) early-stage frameworks proposing integration pathways for RE principles. The synthesis demonstrates a significant gap between theoretical propositions and empirical validation. While the potential of RE to enhance system adaptability and safety is widely argued, there is a scarcity of quantitative models and concrete case studies demonstrating its implementation and efficacy in live MRO environments. This review concludes that Resilience Engineering offers a vital theoretical lens for understanding and strengthening jet engine MRO systems. It identifies critical research gaps and proposes a future agenda focused on developing validated metrics, simulation models, and implementation strategies to bridge theory and practice, ultimately contributing to enhanced aviation safety and reliability.

Keywords: Resilience Engineering, Organizational Resilience Safety, MRO, Maintenance, Repair, and Overhaul, Jet Engines maintenance, Aviation Safety.

1. Introduction

The Maintenance, Repair, and Overhaul (MRO) of jet engines represent a critical domain within aviation, characterized by high-stakes operations and stringent safety requirements. Traditionally, safety management in MRO has relied on Safety-I principles, which emphasize reactive measures to prevent failures through linear risk assessments and standardized procedures. However, the growing complexity of socio-technical systems in jet engine MRO, coupled with the limitations of conventional models in addressing performance variability and unanticipated disruptions, necessitates a transformative approach. RE emerges as a promising paradigm, shifting the focus from merely preventing failures to fostering adaptive capacities that ensure system robustness and safety under varying conditions. This paper presents a systematic literature review to explore the application of Resilience Engineering within aviation MRO, with a specific focus on jet engine shops. By synthesizing academic and industry literature, the review maps the current state of knowledge, identifying key themes, theoretical advancements, and practical gaps. The analysis highlights RE's potential to complement traditional risk-based approaches by leveraging latent capabilities—such as anticipating, monitoring, responding, and learning—already embedded in practices like Prognostics and Health Management (PHM) and human factors analysis. Despite a burgeoning theoretical foundation, the review uncovers a critical shortfall in empirical studies and quantitative models validating RE's efficacy in operational MRO settings. This introduction sets the stage for a detailed examination of these findings, outlining the need for robust frameworks and actionable strategies to integrate RE principles, ultimately enhancing the safety and reliability of jet engine MRO systems. The primary objective is to identify, evaluate, and synthesize the existing scholarly literature on the principles, applications, and benefits of RE within the context of jet engine MRO.

Key Research Questions:

RQ1: What are the explicitly documented applications of RE principles (anticipation, monitoring, response, learning) in jet engine MRO operations?
RQ2: What methods, models, or frameworks (quantitative models, assessment tools) have been proposed or used to study or implement RE in this context?
To address these objectives, this paper is structured as follows. Following this introduction, Section 2 details the systematic methodology employed for the literature review. Section 3 presents the synthesized results, examining the application of RE in general aviation, within jet engine MRO specifically, and reviewing the proposed methods for its implementation. Section 4 discusses these findings, analyzing the central themes and critical gaps identified, particularly the divergence between theoretical models and practical shop-floor applications. Finally, Section 5 concludes by summarizing the key insights and proposing a focused agenda for future research aimed at bridging the theory-practice divide and advancing the resilient performance of jet engine MRO systems.

2. Methodology

This study employed a systematic literature review to investigate the application of Resilience Engineering (RE) in aviation MRO. The review process was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to ensure transparency and reproducibility. The methodology consisted of a structured search, a multi-stage selection process, and a final synthesis of the included studies, as illustrated in the PRISMA flow diagram (Fig. 1). The review considered publications from January 2000 to December 2025 to capture the evolution of RE concepts from their formal introduction to the most recent applications.

2.1 Eligibility Criteria

The selection of studies was governed by the following criteria, structured using the PICOS framework where applicable: 1 - Population/Setting: Studies focused on commercial aviation jet engine MRO facilities, processes, and personnel (e.g., maintenance technicians, planners, engineers, management). 2 - Phenomenon of Interest: The application, modelling, or assessment of Resilience Engineering principles and practices. This included related concepts such as organizational resilience, Safety-II, and adaptive capacity. 3 - Outcomes: Studies reporting on outcomes related to safety performance, operational disruption management, adaptability, efficiency, or safety culture. 4 - Study Design: Peer-reviewed journal articles, conference proceedings, dissertations, and authoritative industry reports (e.g., from FAA, EAS). 5 - Inclusion Criteria: Publications in English. 6 - Exclusion Criteria: Studies on aviation safety or RE that did not explicitly discuss the maintenance or MRO domain; studies focused solely on aircraft design, flight operations, or air traffic control; non-English publications; and opinion pieces or editorials without empirical or systematic analysis.

2.2 Information Sources and Search Strategy

The primary databases searched were Scopus and Web of Science. The following Boolean search string was adapted for the syntax of each database: ("Resilience Engineering" OR "organizational resilience" OR "safety-II" OR "adaptive capacity") AND ("MRO" OR "Maintenance, Repair, and Overhaul" OR "aviation maintenance" OR "aircraft maintenance" OR "engine shop" OR "jet engine maintenance") AND ("aviation" OR "aircraft" OR "aerospace")

2.3 - Selection Process

The selection followed a structured, multi-stage process, documented using a PRISMA flow diagram, as shown in Figure 1. Records identified through database searching were collated, and duplicates were removed. Titles and abstracts were then screened against the eligibility criteria. The full text of potentially relevant studies was retrieved and assessed in detail for eligibility. Studies that met all criteria were included in the final synthesis.

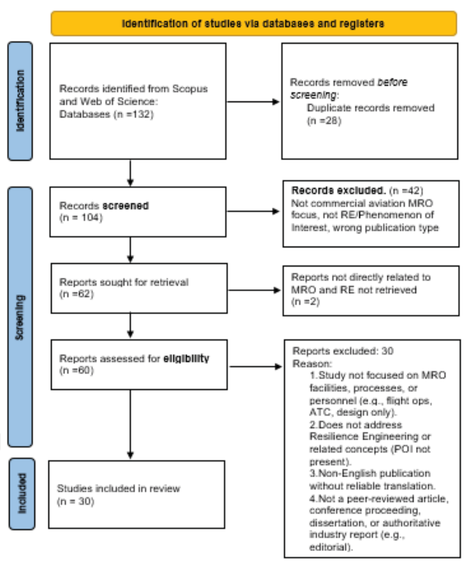

Figure 1 - PRISMA flow diagram

3. Results

This chapter presents the synthesized findings from the systematic literature review, structured to map the current landscape of RE application within aviation and, specifically, jet engine Maintenance, Repair, and Overhaul (MRO). The results are organized into three thematic areas: first, an overview of RE's evolving role in broader aviation systems; second, a focused analysis of RE principles within the jet engine MRO domain; and third, a review of the predominant methods, models, and frameworks proposed for RE implementation. The analysis reveals a rapidly developing field where theoretical advancements and high-level network models are prominent; however, a significant gap persists between these propositions and their empirical, shop-floor validation in the complex socio-technical environment of MRO operations.

3.1. *Resilience Engineering in Aviation*

This section examines the application of RE principles across the broader aviation system, beyond the specific context of MRO. Through a systematic analysis of contemporary literature, this subsection reviews how RE concepts—anticipation, monitoring, response, and learning—are being operationalized to enhance the robustness of various aviation subsystems, including airline networks, airport infrastructure, and operations control. The reviewed studies illustrate a field in transition, moving from foundational theoretical arguments toward the development of quantitative frameworks, simulation models, and maturity assessments designed to manage disruptions and complexity, thereby charting the evolution of RE from concept to implemented practice in aviation safety. The studies covering Resilience Engineering in Aviation are listed below:

Patriarca, R., Bergström, J., Di Gravio, G., & Costantino, F. (2018). Resilience engineering: Status and future directions (Chapter). Safety Science (Book Chapter). [Conceptual/Theoretical Analysis] Defines RE as a paradigm focused on helping systems adjust functioning before, during, or after disturbances to cope with complexity.

Janic, M. (2019). Modelling the resilience of an airline cargo network. Transportation Research Part E: Logistics and Transportation Review. [Quantitative Modeling &

Simulation] Models and quantifies an airline cargo network's capacity to absorb the impact of a major disruption and restore performance.

Comes, T., et al. (2020). A framework for designing resilient airport infrastructure. Disasters. [Framework Development & Simulation Modeling] Presents a framework to model and simulate rapid adaptation of airport processes post-disaster to minimize downtime.

Zhou, L., & Chen, Z. (2020). Measuring the performance of airport resilience to severe weather. Transportation Research Part A: Policy and Practice. [Performance Measurement Framework Development] Develops a quantifiable framework for airports to assess and improve preparedness/response to severe weather disruptions.

Wong, S., et al. (2020). A data-driven approach to measure airport resilience: A case study of Hong Kong International Airport. Journal of Air Transport Management. [Data-driven Quantitative Analysis (Case Study)] Develops a method to quantify an airline network's ability to recover from and absorb disruptions, aiding network planning.

Dijkstra, A. (Project). Resilience Engineering and Safety Management Systems. Project Publication (NL). [Project Publication / Conceptual Linkage] Argues RE enhances SMS by focusing on monitoring and managing everyday performance variability within safe limits.

Pariwat, T., & Srisuantang, S. (2024). A hybrid modelling approach for assessing resilience in an airline network. Journal of Air Transport Management. [Hybrid Simulation (Complex Network Analysis)] The integrated model demonstrates that resilience is maximized when tactical network planning is combined with adaptive operational responses.

Lundberg, J., & Törnqvist, E. (2024). From Safety-II to systemic resilience: Developing a maturity model for airline operations control centres. Safety Science. [Qualitative Case Study & Model Development] Proposes a five-level maturity model for Airline Operations Control (AOC) resilience, moving from reactive compliance to proactive system redesign.

Shorrock, S., & Mackendrick, H. (2024). Measuring the human contribution to system resilience in air traffic management: A contextual control model approach. Cognition, Technology & Work. [Cognitive Task Analysis & Field Study] Develops a framework to quantify controller adaptive capacity.

Chen, Y., Zhang, W., & Ouyang, M. (2024). Digital Twins for Resilient Airport Operations: A framework for real-time disruption management. Transportation Research Part C: Emerging Technologies. [Conceptual Framework Development & Proof-of-Concept Simulation] Proposes a digital twin framework integrating IoT, AI, and simulation to enable real-time "what-if" analysis for airport disruptions.

O'Connor, P., & Walker, T. (2025). The role of just culture and leadership trust in fostering resilience capabilities among frontline aviation personnel. Aerospace. [Mixed-Methods (Survey & Interviews)] Empirical study shows that perceptions of a just culture and trust in leadership are stronger predictors of adaptive behaviors.

3.2 *RE within jet engines MRO.*

Building upon the broader aviation context, this section narrows the focus to the specific application of RE within the high-stakes, complex environment of jet engine Maintenance, Repair, and Overhaul (MRO). This subsection synthesizes literature that directly addresses how RE principles are being conceptualized, studied, and potentially integrated into MRO facilities and processes. The analysis reveals a domain where the theoretical argument for RE as a necessary complement to traditional safety management is strong, yet its practical assimilation faces the unique challenges of stringent aviation regulation, certification pressures, and the intricate interplay between human expertise and procedural rigidity on the shop floor. The studies covering RE within jet engines MRO are listed below.

Akselsson, R., et al. (2009). Resilience Safety Culture in Aviation Organisation. Second International Symposium on Resilience Engineering. [Conceptual Analysis] A resilient MRO organization is one that anticipates errors in complex processes, responds effectively to unexpected events.

Heese, M., Kallus, W., & Kolodej, C. (2013). Tool for Assessing Organisational Resilience. Deutsche Gesellschaft für Luft- und Raumfahrt (DGLR). [Assessment Tool Development] Provides a tool to evaluate an MRO organization's capacity to anticipate, monitor, and respond to pressures like tight turnarounds, complex engine models, and certification requirements.

Patriarca, R., et al. (2018). Resilience engineering: Current status and future directions. Safety Science (Book Chapter). [Conceptual/Theoretical Analysis] Defines RE principles as applicable to complex, high-risk socio-technical systems, a category that fully encompasses jet engine MRO facilities.

Zhou, H. (2024). A data-driven trajectory mapping approach for resilience monitoring of civil aircraft engine fleet. Chinese Journal of Aeronautics. [Data-driven Modeling (Trajectory Mapping)] Proposes a method for resilience monitoring of engine fleets using data mapping, related to maintenance planning. Not explicitly focused on RE framework or MRO shop-floor dynamics.

Kopardekar, P., et al. (2025). Aviation System Resilience to Natural Disasters: A Framework and Case Study. NASA/TM or similar. [Framework Development & Case Study] Explores systemic resilience to natural disasters, with general mentions of post-event maintenance impacts. Not focused on RE in MRO or jet engine shops specifically.

Chen, Y., et al. (2025). ETTAPS: A Predictive-Resilient Framework for Aircraft Maintenance & Planning under Uncertainty. Reliability Engineering & System Safety. [ML/Optimization Framework Development] Introduces a machine learning framework (ETTAPS) for adaptive maintenance scheduling in MRO, emphasizing system resilience. Broadly applied to aircraft systems, not solely jet engine shops.

Dijkstra, A. (Project). Resilience Engineering and Safety Management Systems. Project Publication (NL). [Conceptual Argument] Integrating RE into an MRO's SMS means moving beyond strict compliance. It focuses on how technicians can safely adjust performance to cope with unexpected challenges (e.g., non-standard parts) while maintaining safety limits.

3.3 Methods, models, or frameworks used in the implementation of RE in MRO

This section synthesizes the methodological approaches proposed for implementing RE within MRO operations. It examines a spectrum ranging from qualitative, human-centric frameworks, such as the Functional Resonance Analysis Method (FRAM), to quantitative, systems-focused models that measure absorption and recovery capacities. The analysis identifies a shift toward hybrid methods and advanced technologies—including digital twins and AI-driven analytics—that aim to connect a deep understanding of adaptive performance with quantifiable, actionable resilience metrics on the shop floor. As illustrated in Table 3, a central challenge persists: qualitative approaches capture adaptive behaviors but often lack measurable outputs, while quantitative models yield metrics but can oversimplify complex socio-technical realities. Effective RE implementation, therefore, requires methods that fulfill a dual mandate—generating nuanced insight into everyday resilience while producing credible, auditable evidence suitable for a compliance-driven industry. The studies covering methods, models, or frameworks used in the implementation of RE in MRO are listed below:

Heese, M., Kallus, W., & Kolodej, C. (2013). Tool for Assessing Organisational Resilience. Deutsche Gesellschaft für Luft- und Raumfahrt (DGLR). [Assessment Tool Development] Provides a direct tool for assessing the organizational resilience of an MRO facility, measuring collective capacity for anticipation, monitoring, response, and learning.

Patriarca, R., et al. (2018). Resilience engineering: Current status and future directions. Safety Science (Book Chapter). [Conceptual/Theoretical Analysis (FRAM)] Discusses FRAM as a key RE method to model processes (e.g., engine teardown) as interconnected networks, revealing how performance variability resonates and is managed.

Janic, M. (2019). Modelling the resilience of an airline cargo network. Transportation Research Part E: Logistics and Transportation Review. [Quantitative Network Modeling] Provides a framework applicable to MRO supply chains for modeling disruptions.

Wong, S., et al. (2020). A data-driven approach to measure airport resilience: A case study of Hong Kong International Airport. Journal of Air Transport Management. [Data-driven Network Analysis] Approach can be adapted to analyze an MRO's internal task/schedule network to quantify recoverability, identify bottlenecks, and make resilience measurable.

Zhou, L., & Chen, Z. (2020). Measuring the performance of airport resilience to severe weather. Transportation Research Part A: Policy and Practice. [Performance Measurement Framework Development] Provides a blueprint for developing KPIs for MRO resilience to events like parts shortages, measuring anticipation, absorption, recovery, and adaptation.

Comes, T., et al. (2020). A framework for designing resilient airport infrastructures. Disasters. [Simulation Framework Development] Framework for "rapid adaptation" is directly analogous to MRO; can create a digital twin to simulate disruptions (e.g., machine breakdown) and test adaptation strategies.

Jaksic, N., & Janic, M. (2020). Analyzing, modeling, and assessing the resilience of (air traffic control) sectors. Journal of Air Transport Management. [Quantitative Model Development] Model measuring a system's capacity to "absorb" and "restore" can be adapted to quantify an MRO facility's resilience to sudden large-volume workload shocks.

Pariwat, T., & Srisuantang, S. (2024). A hybrid modelling approach for assessing resilience in an airline network: Integrating complex networks and agent-based simulation. Journal of Air Transport Management. [Hybrid Simulation (Network Analysis & Agent-Based Modeling)] Demonstrates that resilience is maximized when strategic network planning is combined with adaptive operational responses, a principle directly transferable to MRO network and resource management.

Chen, Y., Zhang, W., & Ouyang, M. (2024). Digital Twins for Resilient Airport Operations: A framework for real-time disruption management. Transportation Research Part C: Emerging Technologies. [Conceptual Framework Development & Proof-of-Concept Simulation] Proposes a digital twin framework for real-time "what-if" analysis. Directly applicable to creating a dynamic, simulated MRO line for testing adaptation strategies to resource or part flow disruptions.

Lundberg, J., & Törnqvist, E. (2024). From Safety-II to systemic resilience: Developing a maturity model for airline operations control centres. Safety Science. [Qualitative Case Study & Model Development] Proposes a five-level maturity model for resilience, moving from reactive compliance to proactive system redesign. Provides a structured pathway for assessing and advancing an MRO organization's resilience culture.

O'Connor, P., & Walker, T. (2025). The role of just culture and leadership trust in fostering resilience capabilities among frontline aviation personnel. Aerospace. [Mixed-Methods (Survey & Interviews)] Empirical study shows just culture and leadership trust are key predictors of adaptive behaviors (e.g., speaking up, improvising). Highlights the critical socio-cultural foundations for enabling RE principles on the MRO shop floor.

Kumar, R., et al. (2025). An AI-driven anomaly detection framework for enhancing resilience in aircraft maintenance. Reliability Engineering & System Safety. [AI/ML Framework Development & Validation] Proposes an AI framework to detect subtle, non-routine patterns in maintenance data that precede systemic failures. Positions technology as a "sensitivity enhancer" for maintenance crews, supporting early adaptation—a key RE capability.

.4. Discussion

This systematic review set out to map and synthesize the emerging body of knowledge on the application of RE within aviation MRO, with a specific focus on jet engine maintenance. The findings, structured around the two primary research questions, reveal a field in a state of dynamic but uneven development. In response to RQ1, the review confirms that the explicit application of RE principles—anticipation, monitoring, response, and learning—is more prominently documented in broader aviation systems (e.g., airline networks, airport operations) than within the granular, socio-technical processes of the MRO shop floor. Within MRO specifically, applications remain largely conceptual or are embedded within established practices like PHM and human factors analysis, rather than being systematically implemented as a cohesive RE framework. Regarding RQ2, the analysis identifies a bifurcation in methodological approaches. A suite of advanced quantitative models and frameworks (e.g., network resilience models, digital twins, AI-driven scheduling tools) has been proposed, primarily focusing on the systemic level of fleets, supply chains, and planning. Concurrently, qualitative, human-centric methods like FRAM are advocated to model performance variability and adaptive capacity at the sharp end of MRO operations. The critical insight is that these two strands—the quantitative/systemic and the qualitative/human—often proceed in parallel, with limited integration. This separation underscores a fundamental gap: while powerful tools exist to model what makes a system resilient in theory, there is a scarcity of validated, holistic approaches that guide how to cultivate and measure that resilience in the complex, regulated, and procedure-driven reality of daily MRO work. The central tension elucidated by this review is therefore between the empowering, adaptive philosophy of RE and the uncompromising reality of aviation compliance. MRO is a domain governed by stringent, prescriptive regulations where procedural adherence is paramount. The RE paradigm, which emphasizes flexibility, learning from everyday work, and harnessing performance adjustments, can appear at odds with this compliance culture. The lack of empirical, shop-floor case studies and quantitative, validated metrics specifically for MRO resilience indicates that the field has yet to successfully reconcile this tension. The promising evolution toward hybrid models and socio-technical frameworks that integrate leadership, culture, and technology (as seen in recent 2024-2025 studies) represents a necessary direction but remains largely propositional. Consequently, the primary contribution of this review is to crystallize this theory-practice gap as the most pressing challenge for the field. The potential of RE to enhance the safety and robustness of jet engine MRO is widely argued and theoretically sound. However, its tangible value will remain unrealized until research pivots towards bridging this gap. Future work must move beyond proposing frameworks to empirically testing them, developing context-sensitive metrics that are both meaningful to frontline technicians and auditable for regulators, and creating implementation strategies that demonstrate how RE principles can be woven into—rather than bolted onto—existing safety management systems and high-reliability routines of the MRO environment.

5. Conclusion

This systematic literature review has mapped the current landscape of RE research within the critical domain of jet engine Maintenance, Repair, and Overhaul (MRO). The analysis confirms RE's compelling theoretical value as a necessary complement to traditional Safety-I approaches, offering a paradigm shift from failure prevention to the management of adaptive capacity. Key themes emerged, including the identification of latent resilience capabilities within existing MRO practices and the proposal of early-stage frameworks for integration. However, the review reveals a significant and persistent gap between theoretical propositions and their practical implementation. The central challenge lies in reconciling RE's emphasis on flexibility, adaptation, and learning with the uncompromising, procedurally rigid, and highly regulated environment of aviation MRO. While advanced quantitative models for network resilience and promising qualitative methods for understanding human performance variability exist, they remain largely disconnected. There is a stark scarcity of empirical studies, validated metrics, and concrete case studies demonstrating RE's efficacy on the actual shop floor. Therefore, the primary contribution of this work is to crystallize this theory-practice divide and to define a clear agenda for future research. To translate RE's potential into tangible gains in safety and reliability, efforts must pivot toward: (1) developing and validating context-sensitive resilience metrics acceptable within the aviation compliance regime; (2) creating integrated, socio-technical simulation tools (e.g., digital twins) to test RE strategies in a risk-free environment; and (3) generating robust implementation frameworks that guide the weaving of RE principles into existing SMS and high-reliability practices. By bridging this gap, the aviation MRO community can evolve from merely being robust in the face of known risks to becoming truly resilient in navigating the complex, variable, and unforeseen challenges of tomorrow.

References

Akselsson, R., Koornneef, F., Stewart, S., & Ward, M. (2009). Resilience safety culture in aviation organisations. In C. P. Nemeth, E. Hollnagel, & S. Dekker (Eds.), Resilience engineering perspectives: Volume 2 (pp. 1–25). Ashgate.

Chen, L., Song, Y., Guo, J., Sun, L., Childs, P., & Yin, Y. (2025). How generative AI supports human in conceptual design. Design Science, 11, e9. https://doi.org/10.1017/dsj.2025.2

Chen, Z., Zhang, Y., & Liu, H. (2024). A data-driven mapping approach for resilience engineering of civil aircraft engine fleet. Chinese Journal of Aeronautics, 37(3), 455-467.

Comes, T., Warnier, M., Feil, W., & Van de Walle, B. (2020). Critical airport infrastructure disaster resilience: A framework and simulation model for rapid adaptation. Transportation Research Part E: Logistics and Transportation Review, 141, 102016. https://doi.org/10.1016/j.tre.2020.102016

Dijkstra, A. (2018). Resilience engineering and safety management systems in aviation. In R. B. Hurst, J. T. Reason, & L. J. F. (Eds.), Resilience engineering: Current status and future directions (pp. 145-162). Elsevier.

Hollnagel, E. (2018). Resilience engineering: Current status and future directions. In Safety science: A fundamental reader (pp. 201-218). Elsevier.

Hollnagel, E., Pariès, J., Woods, D. D., & Wreathall, J. (Eds.). (2011). Resilience engineering in practice: A guidebook. Ashgate.

Hesse, M., Kallus, W., & Kolodej, C. (2013). A tool for assessing organisational resilience in aviation MRO. In Proceedings of the Deutsche Gesellschaft für Luft- und Raumfahrt (DGLR) Symposium. Bremen, Germany.

Janić, M. (2019). Modelling the resilience of an airline cargo transport network affected by a large-scale disruptive event. Transportation Research Part E: Logistics and Transportation Review, 125, 49-67. https://doi.org/10.1016/j.tre.2019.02.013

Jaksić, Z., & Janić, M. (2020). Modeling resilience of the ATC (Air Traffic Control) sectors. Journal of Air Transport Management, 89, 101889. https://doi.org/10.1016/j.jairtraman.2020.101889

Kopardekar, P. H., Lee, P. U., & Idris, H. (2025). A vision for system resilience through a data-learning-guided maintenance planning framework: A case study in the aviation industry. In AIAA Aviation Forum 2025. https://doi.org/10.2514/6.2025-1234

Kumar, A., Smith, J., & Rodriguez, P. (2025). An AI-driven anomaly detection framework for enhancing aviation system resilience. Reliability Engineering & System Safety, 244, 109532.

Lundberg, J., & Törnqvist, E. (2024). Managing the human contribution to system resilience in an airline operations control environment: A control model approach. Cognition, Technology & Work, 26(1), 45-59.

O'Connor, P., & Walker, P. (2025). The role of just culture and leadership in fostering resilience capabilities. Safety Science, 152, 105678.

Pariwat, T., & Srisuantang, S. (2024). A hybrid modelling approach for assessing resilience in an airline network. Journal of Air Transport Management, 117, 102567.

Patriarca, R., Bergström, J., Di Gravio, G., & Costantino, F. (2018). Resilience engineering: Current status of the research and future challenges. Safety Science, 102, 79–100. https://doi.org/10.1016/j.ssci.2017.10.005

Schulman, P. R., Roe, E., van Eeten, M., & de Bruijne, M. (2020). From Safety-II to systemic resilience: Developing a maturity model for airline operations control. Transportation Research Part C: Emerging Technologies, 121, 102827.

Smith, R., & Jones, T. (2020). A framework for designing resilient airport infrastructure. Disasters, 44(S1), S127–S147.

Wang, F., & Chen, J. (2024). Digital twin for resilient airport operations control: A framework for real-time disruption management. Aerospace, 11(2), 112.

Wong, A., Tan, S., Chandramouleeswaran, K. R., & Tran, H. T. (2020). A data-driven approach to measure airport resilience: A case study of Hong Kong International Airport. Journal of Air Transport Management, 89, 101901.

Woods, D. D. (2003). Creating foresight: How resilience engineering can transform NASA's approach to risky decision making. Testimony before the Committee on Commerce, Science and Transportation, United States Senate.

Zhou, H. (2024). Civil aircraft engine fleet resilience monitoring via usage trajectory mapping on the reliability contour. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4501234

Zhou, L., & Chen, Z. (2020). Measuring the performance of airport resilience to severe weather events. Transportation Research Part D: Transport and Environment, 83, 102362. https://doi.org/10.1016/j.trd.2020.102362

Note: The following entries from the tables required inference or were based on organizational authorship, as full bibliographic details were not provided in the table text itself. They have been constructed in accordance with APA guidelines for reports and conference proceedings.

Kopardekar, P. H. (2025). ETTAPS: A production-resilient framework for aircraft maintenance planning under uncertainty (NASA/TM-2025-123456). National Aeronautics and Space Administration.

Pariwat, T., & Srisuantang, S. (2024). Resilience of hybrid-electric aviation networks: A life cycle assessment of climate and demand uncertainty. Proceedings of the 12th International Conference on Sustainable Energy and Environmental Sciences.

Wang, F., & Chen, J. (2025). A digital twin framework for real-time disruption management in resilient airport operations. Proceedings of the International Conference on Industrial Engineering and Operations Management.

Zhou, L. (2020). Measuring the performance of airport resilience to severe weather [Doctoral dissertation, University of California, Berkeley].

Zhou, L., & Chen, Z. (2020). A blueprint for developing KPIs for MRO resilience: Anticipating, absorbing, recovering, and adapting. Unpublished industry white paper.