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A Study on the Implementation of Controlled Rest in the Republic of Korea

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ABSTRACT

Controlled Rest in Position (CRiP) is recognized as an effective fatigue mitigation strategy and has already been adopted by a number of civil aviation authorities around the world, including those in North America, Europe, and parts of Asia. This procedure allows pilots to take short, controlled naps while remaining in their assigned flight position, under specific operational and safety protocols, with the aim of reducing fatigue and maintaining alertness during critical flight phases. Despite the documented safety and performance benefits demonstrated in various international studies and operational trials, Korea has yet to introduce formal regulations or detailed implementation guidelines for CRiP. This study reviews global practices, operational procedures, and regulatory frameworks related to controlled rest, drawing on examples from jurisdictions where the concept has been successfully integrated into commercial aviation. It evaluates their potential applicability to the Korean aviation environment, taking into account local operational conditions, cultural factors, and regulatory structures. The results indicate that, if supported by clear procedures, crew training, and robust safety measures, CRiP could serve as a valuable tool for enhancing pilot alertness, reducing fatigue-related incidents, and ultimately improving overall operational safety in Korea's commercial air transport sector.

Key Words : Controlled Rest in Position(조종실내 통제된 휴식), Fatigue(피로), Fatigue Risk Management System(피로 위험 관리 시스템), Sleep Inertia(수면관성), Subtle Incapacitation(미묘한 무능력)

Ⅰ. Introduction

Fatigue management has become a critical issue in modern aviation safety, with pilot fatigue recognized as a significant contributing factor in aviation incidents worldwide. Controlled Rest in Position (CRiP), commonly referred to as controlled rest, is a fatigue mitigation strategy that permits pilots to take short, supervised naps on the flight deck during low workload cruise phases. This practice has been successfully implemented in several countries under strict regulatory oversight and operational guidelines. However, the Republic of Korea has not yet adopted a formal framework for controlled rest in its aviation operations.

This study explored the feasibility and implications of introducing controlled rest into the Korean aviation regulatory environment. Through comparative analysis of ICAO recommendations, EASA and FAA guidelines, and case studies from countries where controlled rest is

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already in use, the research identifies best practices and evaluates their applicability within the Korean context. Furthermore, the study assesses potential operational, cultural, and safety-related challenges specific to Korean commercial aviation.

Findings suggested that the adoption of controlled rest, when paired with robust training, monitoring, and safety protocols, could significantly enhance pilot alertness and overall flight safety. The study concludes with policy recommendations aimed at the gradual integration of controlled rest into the Republic of Korea's aviation safety regulations.

II. Discussion

2.1 Overview of Controlled Rest and International Practices

Controlled Rest in Position (CRiP) constitutes a method for combating pilot fatigue. This allows flight crew members to engage in brief, monitored periods of rest within the cockpit during times of reduced operational demand, typically while the aircraft is at cruising altitude. The primary purpose of this approach is to enhance pilot vigilance and minimize the likelihood of errors stemming from tiredness, especially as the flight transitions into crucial stages like descent and final approach.

The International Civil Aviation Organization (ICAO) recognizes fatigue as a serious safety issue and encourages member states to adopt Fatigue Risk Management Systems (FRMS), which include strategies like controlled rest. While ICAO does not mandate CRiP specifically, it provides guidelines under Doc 9966 (Manual for the Oversight of Fatigue Management Approaches)[1] for its implementation as part of broader fatigue risk management policies.

Controlled rest has been officially adopted by several major aviation authorities. The European Union Aviation Safety Agency (EASA) allows controlled rest under specific conditions, such as a maximum duration of 45 minutes, with at least 20 minutes of recovery time afterward, and a second pilot remaining fully alert.[2] The procedure must be clearly described in the operator's operations manual and approved by the national aviation authority.

Similarly, the Federal Aviation Administration (FAA) in the United States does not formally regulate controlled rest but the U.S. Coast Guard has permitted controlled rest since 2013, and the U.S. Air Force has done so since 2017.[3] The Civil Aviation Safety Authority (CASA) in Australia also supports controlled rest as part of FRMS, provided that there is proper training, monitoring, and risk assessment in place.[4]

Studies from airlines such as Air Canada, Qantas, and British Airways have shown that controlled rest, when used correctly, can improve crew performance, reduce microsleeps during high workload phases, and lead to better overall safety outcomes.[5] These implementations generally emphasize the importance of pre-rest briefings, cockpit environment preparation (e.g., seat recline, alarms), and post-rest recovery protocols.

Despite its proven benefits, the practice is not without controversy. Concerns include the potential for sleep inertia, improper supervision, or misunderstanding of procedures, all of which could pose operational risks if not carefully managed. Hence, international best practices recommend strict adherence to procedures, comprehensive crew training, and continuous data monitoring.

2.1.1 Concept and Effectiveness of Controlled Rest

Controlled Rest in Position (CRiP), commonly

known as controlled rest, is a fatigue management technique that allows pilots to take short, planned naps while seated at their duty station on the flight deck during low workload phases, typically during cruise flight. The primary objective of controlled rest is to reduce the physiological and cognitive effects of fatigue and help pilots regain alertness before critical phases of flight such as descent, approach, and landing.

Unlike in-flight crew rest that takes place in designated rest facilities during long-haul operations, controlled rest is performed in the pilot's seat and under specific conditions. One pilot remains fully alert and in command, while the other rests, typically for a duration of 20–45 minutes. The resting pilot must be awakened well before any high workload period begins and must undergo a recovery period to overcome potential sleep inertia.

The concept is grounded in well-established sleep science. Short naps, often referred to as "power naps," have been shown to restore alertness, improve reaction time, and enhance decision-making capabilities. In operational environments, studies have demonstrated that even brief periods of sleep can significantly reduce the risk of fatigue-induced errors, which are particularly dangerous in high-risk domains like aviation.

Controlled rest is particularly effective during night operations or long-haul flights where circadian rhythms are disrupted, and sustained attention is required over extended periods. The practice has been supported by numerous fatigue studies conducted by institutions such as NASA, which showed measurable performance improvements in pilots after brief cockpit naps.[6]

However, the effectiveness of controlled rest depends on several critical factors, including:

- Proper timing during stable flight phases
- Strict adherence to protocols and standard operating procedures
- Effective communication and coordination between flight crew members
- Adequate post-rest recovery time to mitigate sleep inertia

When implemented properly within a comprehensive Fatigue Risk Management System (FRMS), controlled rest can serve as a valuable operational countermeasure. It helps reduce cumulative fatigue over the course of duty and enhances overall flight safety by maintaining a higher level of alertness, especially in the latter stages of a flight.

2.1.2 Implementation Status in ICAO and Major Countries

The International Civil Aviation Organization (ICAO) recognizes fatigue as a major risk factor in aviation and provides guidance for managing it through Fatigue Risk Management Systems (FRMS). Although ICAO does not mandate the use of Controlled Rest in Position (CRiP), it acknowledges it as a potential fatigue mitigation strategy in its Doc 9966 guidelines. The implementation of controlled rest, however, is left to the discretion of individual member states and operators.

In Europe, the European Union Aviation Safety Agency (EASA) allows controlled rest under strict conditions, such as a maximum rest duration of 45 minutes and clear operational procedures. Similarly, Australia's CASA supports its use within FRMS-approved operations.

The United States FAA does not formally approve CRiP in regulation but permits airline-specific fatigue management programs that may include rest practices with internal oversight.

Several airlines in Canada, the UK, and the Middle East have successfully implemented

controlled rest policies, demonstrating improved safety outcomes.[7] While global standards vary, the trend shows increasing recognition of CRiP as a safe and effective fatigue countermeasure when applied under strict protocols.

2.2 Korean Aviation Context and Feasibility

The Republic of Korea's aviation sector has rapidly expanded, leading to increased flight operations and pilot workload. While existing regulations govern flight duty periods and rest requirements, controlled rest is not yet formally adopted within Korean aviation safety practices. Current fatigue management primarily depends on duty time limits without systematic implementation of in-flight fatigue mitigation measures such as controlled rest.

Korea's aviation environment features predominantly short-haul flights, dense air traffic, and complex weather conditions, which present unique operational challenges. Despite these factors, controlled rest could offer meaningful benefits, particularly for longer domestic flights and overnight operations, by enhancing pilot alertness and reducing fatigue-related risks.

However, the successful introduction of controlled rest in Korea requires overcoming several obstacles. These include cultural acceptance among pilots and operators, development of appropriate regulatory frameworks, and comprehensive training and monitoring programs to ensure safe and effective use. Moreover, adapting international best practices to suit Korea's specific operational context is essential.

2.2.1 Current Fatigue Management Practices in Korea

In Korea, fatigue management in the aviation industry primarily focuses on regulating flight duty periods and mandatory rest times for flight crews, in accordance with the national aviation regulations. These rules set limits on maximum duty hours and require minimum rest durations to help reduce fatigue risks.

However, the current system relies heavily on prescriptive regulations rather than proactive fatigue risk management approaches. Unlike some international operators that implement comprehensive Fatigue Risk Management Systems (FRMS), Korean airlines have yet to widely adopt advanced fatigue mitigation strategies, such as controlled rest or real-time fatigue monitoring.

Moreover, cultural factors and operational practices may influence how fatigue is perceived and managed within Korean airlines. For example, the hierarchical organizational culture and the emphasis on strict adherence to schedules can sometimes limit flexible fatigue countermeasures.

Although regulatory compliance ensures a baseline level of fatigue control, there is increasing recognition in Korea of the need to enhance fatigue management. This includes exploring scientifically supported methods like controlled rest, improved scheduling practices, and pilot education to better address the complex nature of fatigue and its impact on flight safety.

2.2.2 Considerations for Implementation of Controlled Rest

Implementing controlled rest within Korean aviation requires careful consideration of several key factors to ensure safety and effectiveness. First, regulatory adaptation is essential; current aviation laws and guidelines must be revised to formally recognize and govern controlled rest practices. This includes defining standardized procedures, allowable

rest durations, and conditions under which controlled rest can be conducted.

Second, cultural acceptance among flight crews and airline management plays a crucial role. Controlled rest is a relatively new concept in Korea, and gaining trust and understanding from pilots is necessary to encourage proper use. Training programs should emphasize the safety benefits and operational protocols to foster acceptance and reduce hesitation.

Third, operational factors such as flight duration, crew composition, and flight phase suitability must be assessed. Since many Korean flights are short-haul, identifying scenarios where controlled rest is both feasible and beneficial is important. Furthermore, airlines must develop clear communication protocols to ensure the resting pilot is safely monitored by the active crew member.

Lastly, robust monitoring and evaluation mechanisms should be established. Continuous data collection on fatigue levels, controlled rest usage, and flight safety outcomes will support ongoing improvements and regulatory compliance.

2.3 Recommendations for Implementation

2.3.1 Institutional and Operational Strategies

To successfully implement controlled rest in Korean aviation, a comprehensive approach involving both institutional and operational strategies is essential.

Institutionally, regulatory authorities such as the Ministry of Land, Infrastructure and Transport (MOLIT) and the Korean Aviation Safety Authority need to develop clear policies and guidelines that formally incorporate controlled rest into the national aviation framework. This includes establishing standardized procedures, specifying allowable durations, and defining conditions for controlled rest. Collaboration with international aviation bodies like ICAO can help align Korean regulations with global best practices.

Moreover, aviation stakeholders—including airlines, pilot unions, and training organizations—should be engaged early to build consensus and facilitate smooth policy adoption. Establishing certification and oversight mechanisms will ensure compliance and maintain safety standards.

Operationally, airlines must develop detailed standard operating procedures (SOPs) for controlled rest that cover timing, duration, communication, and monitoring. Training programs are crucial to educate pilots and crew members about the correct implementation, safety benefits, and potential risks associated with controlled rest.

Flight scheduling and crew rostering should be adjusted to optimize opportunities for controlled rest, particularly on long-haul or overnight flights where fatigue risks are highest. Additionally, airlines should implement monitoring systems to track rest effectiveness and gather data for continuous improvement.

2.3.2 Expected Benefits and Potential Limitations

2.3.2.1 Expected Benefits

Controlled rest offers several significant advantages as a fatigue mitigation strategy in aviation. Primarily, it helps restore pilot alertness during long or overnight flights by allowing short, supervised naps during low workload phases. This improvement in alertness can lead to enhanced cognitive performance, quicker reaction times, and reduced likelihood of fatigue-related errors, ultimately increasing overall flight safety. Controlled rest also supports compliance with duty time regulations by providing a practical in-flight solution to manage fatigue. Additionally, it can improve pilot well-being and reduce the risks associated with

extended wakefulness, thereby contributing to safer and more efficient flight operations.

2.3.2.2 Potential Limitations

Despite these benefits, controlled rest has inherent limitations and risks. One major concern is sleep inertia, a temporary state of grogginess and reduced cognitive function immediately after waking, which can impair performance if the pilot must resume duties too quickly. Another challenge is ensuring proper supervision and adherence to protocols to prevent misuse or miscommunication during rest periods. Cultural resistance or lack of understanding among crew members can also hinder effective implementation. Moreover, controlled rest may not be feasible on shorter flights or during high workload phases, limiting its applicability. Therefore, it is essential that controlled rest be integrated within a comprehensive Fatigue Risk Management System (FRMS) and supported by thorough training and monitoring to maximize benefits and minimize risks.

Ⅲ. Conclusion

This study highlights the significant potential benefits and important challenges associated with the implementation of Controlled Rest (CRiP) within the Republic of Korea's aviation sector. Controlled rest has been internationally recognized as an effective fatigue mitigation strategy, proven to enhance pilot alertness and reduce fatigue-related risks during long-haul, overnight, or extended flight operations. Despite Korea's current fatigue management system largely relying on prescriptive duty time regulations and rest requirements, the formal adoption of controlled rest could provide a practical and scientifically supported method to improve in-flight fatigue management.

For successful implementation, it is essential to adapt and tailor international best practices to the specific operational environment and cultural context of Korean aviation. This involves regulatory updates that explicitly permit and regulate controlled rest, ensuring clear guidelines on rest duration, timing, and monitoring. Comprehensive training programs are also necessary to educate pilots and operational staff about the procedures, safety benefits, and potential risks such as sleep inertia. Additionally, fostering cultural acceptance among pilots, airline management, and regulators is critical to encourage correct usage and prevent misuse.

Operational considerations, including flight schedules, crew composition, and communication protocols, must be integrated into standard operating procedures to maximize the safety and effectiveness of controlled rest. Implementing continuous monitoring and evaluation mechanisms will help maintain safety standards and support ongoing improvements.

Ultimately, incorporating controlled rest within a broader Fatigue Risk Management System (FRMS) has the potential to significantly strengthen Korea's aviation safety framework, reduce fatigue-related incidents, and promote safer, more efficient flight operations. To facilitate this transition, further research, pilot studies, and stakeholder engagement are recommended to ensure a smooth and effective adoption process tailored to Korea's unique aviation landscape.

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