



# 交通部民用航空局 民航通告

**主旨：航空器維護手冊人為因素指引(Human Factors Guidelines for Aircraft Maintenance Manual)**

**發行日期：2016.07.07**

**編號：AC 120-028A**

**發行單位：飛航標準組**

## 一、目的：

本民航公告旨在說明 07-02A「航空器飛航作業管理規則」中所述之航空器維護能力手冊及維護計畫之規劃及實施應符合人為因素原則之參考作法，以供航空器使用人之維護組織及人員發展人為因素及相關執行計畫之參考。

## 二、修正說明：

(一)本通告依據 ICAO Doc 9824 Human Factors Guidelines for Aircraft Maintenance Manual 修正。

(二)取代 2004 年 6 月 1 日訂定之 AC 120-028。

## 三、背景說明：

長期以來，許多失事或意外事件係肇因於人為表現失常，且因人類之行為不似數學模式般可以預測或推算，故發生與人為因素有關之事件時，在處理上有其困難度；惟此類事件必須透過立法予以適度規範，使航空產業及其從業人員對類似議題有所警覺，進而提昇或改善飛航安全。

在航空業界中普遍認為維修失誤僅隱藏於個人身上，但依據研究

及統計發現，維修失誤可能肇因於工作及情境因素，最後導致飛航安全與管理不當之維修工作，因妥協而產生不良後果。故維修工作之執行與飛航安全係相輔相成之關係，需建立正確機制並成功執行，以確保飛航安全。

參酌歐美先進國家邇來已發布人為因素計畫，並且發布指引及訓練教材，以喚醒大眾對人為因素的警覺。因此，為期使我國籍航空器使用人或維修廠皆能建制完整之人為因素管理及訓練系統，訂定本民航通告。

#### **四、需求說明：**

07-02A「航空器飛航作業管理規則」，航空器使用人航空器維護能力手冊及維護計畫之規劃及實施應符合人為因素原則。爰參酌國際民航組織文件第 9824 號「航空器維護手冊人為因素指引(ICAO Doc 9824 Human Factors Guidelines for Aircraft Maintenance Manual)」訂定本民航通告，以做為符合法規及執行相關計畫之參考依據。

#### **五、執行要點說明：**

航空器使用人可參照 ICAO Doc 9824 Human Factors Guidelines for Aircraft Maintenance Manual 做為航空器維護能力手冊及維護計畫之規劃及實施應符合人為因素原則之參考作法，節錄其內容如下：

##### **Chapter 1. Why Human Factors in aircraft maintenance — background information and justification**

- 1.1 Evolution and introduction
- 1.2 Maintenance accidents and incidents in relation to other causes
- 1.3 The cost of maintenance errors
- 1.4 The cost of Human Factors interventions
- 1.5 The meaning of Human Factors — concepts and definitions
- 1.6 Quality systems and Human Factors

- 1.7 Training of technical and AME staff
- 1.8 Global or local situation?
- 1.9 Accountability and risk management
- 1.10 The need for standards

Appendix A to Chapter 1 — Major accidents and incidents with maintenance Human Factor causal factors

Appendix B to Chapter 1 — References

## **Chapter 2. Key issues related to maintenance errors**

- 2.1 Introduction
- 2.2 Regulatory oversight
- 2.3 The role of management
- 2.4 Training
- 2.5 Human inspection reliability
- 2.6 Environmental factors
- 2.7 Ergonomics and Human Factors
- 2.8 Communication and document design
- 2.9 Fatigue of maintenance personnel

Appendix A to Chapter 2 — Evolution of commercial aircraft maintenance, 1970-1990

Appendix B to Chapter 2 — Examples of local and organizational factors

Appendix B to Chapter 2 — References

## **Chapter 3. Countermeasures to maintenance errors**

- 3.1 Introduction
- 3.2 Error management programmes — the generic features
- 3.3 Implementation and organization
- 3.4 Communication and maintenance resource management
- 3.5 Inspection and quality systems
- 3.6 Error management in aircraft maintenance
- 3.7 Error capture
- 3.8 Environmental interventions
- 3.9 Ergonomic interventions

3.10 Documentary interventions

3.11 Fatigue interventions

3.12 Some simple interventions

Appendix A to Chapter 3 — Human Factors programmes

Appendix B to Chapter 3 — Shift turnover/handover

Appendix C to Chapter 3 — Task turnover/handover

Appendix D to Chapter 3 — Planning and recording  
non-scheduled maintenance tasks

Appendix E to Chapter 3 — Environmental factors

Appendix F to Chapter 3 — The Ergonomic Audit Program  
(ERNAP) for approved maintenance organizations

Appendix G to Chapter 3 — Document design for aircraft  
maintenance

Appendix H to Chapter 3 — Possible fatigue management  
interventions

Appendix I to Chapter 3 — Maintenance programme  
application — planning

Appendix J to Chapter 3 — References

## **Chapter 4. Reporting, analysis and decision making**

4.1 Introduction

4.2 Objectives

4.3 Error reporting

4.4 Investigation, analysis and standards

4.5 Closing the loop — managing error

Appendix A to Chapter 4 — Error reduction elimination and  
prevention

Appendix B to Chapter 4 — Maintenance error management  
systems

Appendix C to Chapter 4 — Immunity/confidentiality statements

Appendix D to Chapter 4 — Incident reporting — sanctions policy statement

Appendix E to Chapter 4 — A review of maintenance error investigation and analysis systems for possible use by an AMO, operator or State

Appendix F to Chapter 4 — Investigation of the Human Factors aspects of a possible maintenance error incident

Attachment — Suggested AMO Human Factors investigation reporting form

Appendix G to Chapter 4 — References

## **Chapter 5. Training**

- 5.1 Introduction
- 5.2 Background and responsibilities
- 5.3 Training needs and objectives
- 5.4 Implementation and syllabus development
- 5.5 Training delivery techniques
- 5.6 Assessment
- 5.7 Training the regulator

Appendix A to Chapter 5 — Skill and background differences between CRM and MRM

Appendix B to Chapter 5 — Human Factors training needs and objectives

Appendix C to Chapter 5 — Further reading and references

## **Chapter 6. Regulatory policy, principles and solutions**

- 6.1 Introduction
- 6.2 Regulatory policy and objectives
- 6.3 Regulatory principles
- 6.4 Design of the maintenance programme
- 6.5 Application of the maintenance programme
- 6.6 Possible regulatory solutions

Appendix A to Chapter 6 — Suggested industry questionnaire

Appendix B to Chapter 6 — Suggested regulation text

Appendix C to Chapter 6 — References

## **Chapter 7. Additional reference material**

### **六、相關規定及參考文件：**

國際民航組織文件第 9824 號「航空器維護手冊人為因素指引  
(ICAO Doc 9824 Human Factors Guidelines for Aircraft Maintenance  
Manual)」

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