

Table of Contents



INTRODUCTION

1 HUMAN FACTORS IN AVIATION

1.1 Introduction | 1-1

1.2 Accident Statistics | 1-1

1.3 Flight Safety Concepts | 1-4

1.4 The SHELL Model | 1-5

1.5 Pilot's Competency | 1-6

2 FLIGHT PHYSIOLOGY

2.1 The Atmosphere | 2-1

2.2 The Gas Laws | 2-2

2.3 Altitude and Height | 2-4

2.4 Metabolism, Respiration and Circulation | 2-5

2.5 The Respiratory System | 2-6

2.6 The Circulatory System | 2-8

2.7 Oxygen Requirements of the Body | 2-13

2.8 Hypoxia | 2-16

2.9 Cabin Pressurization and Decompression | 2-19

2.10 Decompression Sickness (DCS) | 2-20

2.11 Hyperventilation | 2-21

2.12 Effects of Acceleration | 2-23

2.13 The High Altitude Environment | 2-25

2.14 Extreme Temperatures | 2-27

3 THE NERVOUS SYSTEM

3.1 Introduction | 3-1

3.2 Central and Peripheral Nervous System (CNS and PNS) | 3-2

3.3 Sensory-Somatic and Autonomic Nervous System | 3-3

3.4 Workings of the Nervous System | 3-4

3.5 Sensitivity, Habituation and Adaptation | 3-6

4 VISION

4.1 Introduction | 4-1

4.2 Eye Function | 4-1

4.3 Monocular and Binocular Vision | 4-6

4.4 Dark and Light Adaptation | 4-8

4.5 Night Vision | 4-8

4.6 Defective Vision | 4-9

4.7 Eye protection | 4-12

4.8 Collision Avoidance | 4-12

5 HEARING AND BALANCE

5.1 Introduction | 5-1

5.2 Ear Function | 5-1

5.3 Sound Levels | 5-3

5.4 Hearing Loss | 5-3

5.5 Balance | 5-5

5.6 Motion Sickness | 5-8

5.7 Effects of Alcohol on the Inner Ear | 5-10

5.8 Effects of Vibration | 5-10

6 SPATIAL DISORIENTATION AND SENSORY ILLUSIONS

6.1 Introduction to Spatial Disorientation | 6-1

6.2 Vestibular Illusions | 6-2

6.3 Visual Illusions | 6-7

6.4 How to Prevent Disorientation | 6-12

7 HEALTH AND HYGIENE

7.1 Personal Hygiene | 7-1

7.2 Common Minor Ailments | 7-1

7.3 Nutrition | 7-4

7.4 Obesity | 7-6

7.5 Coronary Heart Disease | 7-8

7.6 Tropical Climates and Disease | 7-10

7.7 Intoxication | 7-12

8 HUMAN INFORMATION PROCESSING

8.1 Introduction | 8-1

8.2 Attention and Vigilance | 8-2

8.3 Perception | 8-6

8.4 Memory | 8-7

8.5 Learning | 8-10

8.6 Decision Making | 8-15

9 HUMAN ERROR

9.1 Introduction | 9-1

9.2 Current Approach to Human Error | 9-1

9.3 The Concept of Error | 9-1

9.4 Typology of Errors | 9-5

9.5 Violations | 9-8

9.6 Error Generation | 9-9

9.7 Accident Causation | 9-14

9.8 Threat and Error Management (TEM) | 9-17

9.9 Safety Culture | 9-21

10 FLIGHT DECK MANAGEMENT

10.1 Introduction | 10-1

10.2 Situational and Safety Awareness | 10-1

10.3 Multi-Crew Co-ordination | 10-2

10.4 Co-Operation | 10-5

10.5 Communication | 10-10

10.6 Communication Barriers on the Flightdeck | 10-17

10.7 Leadership | 10-18

11 PERSONALITY, ATTITUDES AND BEHAVIOUR

11.1 Introduction | 11-1

11.2 Behaviour | 11-2

11.3 Motivation | 11-3

11.4 Personality | 11-6

11.5 Habits and Attitudes | 11-11

11.6 The Right Stuff | 11-13

12 WORKLOAD AND STRESS

12.1 Introduction | 12-1

12.2 Workload | 12-1

12.3 Arousal and Anxiety | 12-2

12.4 Stress | 12-5

12.5 Stress Signs and Symptoms | 12-11

12.6 Stress Management | 12-15

13 SLEEP AND FATIGUE

13.1 Introduction | 13-1

13.2 Length of Sleep | 13-1

13.3 Stages of Sleep | 13-1

13.4 Sleep Credit/Deficit | 13-3

13.5 Body Rhythms and “Zeitgebers” | 13-3

13.6 Time Zone Adjustment | 13-4

13.7 Delaying or Preventing Hypovigilance | 13-5

13.8 Sleep Hygiene | 13-5

13.9 Fatigue | 13-6

14 AUTOMATION

14.1 Introduction | 14-1

14.2 Advantages and Disadvantages of Automation | 14-1

14.3 Existing Automation Philosophies | 14-2

14.4 Working Concepts | 14-4

GLOSSARY

EASA SYLLABUS INDEX