



HUMAN FACTORS IN MAINTENANCE SEMINAR SYLLABUS

INTRODUCTION TO HUMAN FACTORS

THE NEED TO TAKE HUMAN FACTORS INTO ACCOUNT

- Introduction to human factors in aviation maintenance
- The importance of training in Human Factors (MRM)
- The regulatory approach to Human Factors (JAA-EASA)

INCIDENTS ATTRIBUTABLE TO HUMAN FACTORS/HUMAN ERROR

- Case study: The Aloha Accident

STATISTICS

SAFETY CULTURE / ORGANIZATIONAL CULTURE

HUMAN ERROR

ERROR MODELS AND THEORIES

- Introduction to Human Error in Aircraft Maintenance
- Trends in accidents causation
- The Reason model of accident causation
- The Rasmussen model: The three levels of behaviour

TYPES OF ERROR IN MAINTENANCE TASKS

- Top 8 Maintenance problems
- Maintenance error categories
- Types of omission errors: Reason
- The dirty dozen-maintenance errors

IMPLICATIONS OF ERRORS (i.e. ACCIDENTS)

- The Eastern Air Lines accident, Flight 855, May 5 1983



AVOIDING AND MANAGING ERRORS

- The Reason failure model
- Error reduction
- Error capturing
- Error tolerance
- Practical examples of error management: MEDA, MESH

HUMAN RELIABILITY

HUMAN PERFORMANCE AND LIMITATIONS

VISION

- Anatomy of the eye
- Visual scanning
- Factors affecting visual acuity
- Visual inspections

HEARING

- Anatomy and physiology of the ear
- Definition of sounds
- Definition of noise
- Sounds and noise related problems

ATTENTION AND PERCEPTION

- Auditory attention
- Visual attention
- Visual and auditory perception

MEMORY

- How memory works
- Working memory
- Short-term memory
- Long-term memory
- Human memory limitations



INFORMATION PROCESSING

- Model of the Information Processing
- Application of the Model to working life

CLAUSTROPHOBIA AND PHYSICAL ACCESS

- Definition of claustrophobia
- Information Processing's impairment
- Ergonomic factors related to posture and fatigue in the inspection environment

MOTIVATION AND DE-MOTIVATION

- Intrinsic and extrinsic motivation
- How de-motivation triggers accidents

FITNESS/HEALTH

- Physical well-being
- Diet
- Exercise

STRESS: DOMESTIC AND WORK RELATED

- Definition of stress and stressors
- The effects of stressors (examples of domestic and work related stressors)

TIME PRESSURE AND DEADLINES

- How time pressure can squeeze safety margins

SLEEP AND FATIGUE, SHIFTWORK

- Physiology of sleep and circadian rhythm
- Wake-sleep cycle disruption
- Symptoms of fatigue (increased reaction time, canalised thought process, fixation, short term memory loss, impaired judgement and decision making, easily distracted, decreased visual perception, loss of initiative, personality change, depression)
- Causes of fatigue (lack of restful sleep, strenuous activities, dehydration, caffeine, noise and vibration, illness, over-the-counter medications, hypoglycaemia, hypoxia, impaired vision, thermal, boredom, circadian change, unresolved stress)
- Physical and psychological problems associated with working during the night shift



WORKLOAD: OVERLOAD AND UNDERLOAD

- Definition of workload
- Factors affecting workload: training, circadian disruption, sleep deficits, poor schedules, excessive fatigue, procedures, internal and external environment.

ALCOHOL, MEDICATION, DRUG ABUSE

- Over-the-counter medications
- Illegal drugs and alcohol abuse: effects on body and performance

PHYSICAL WORK

- Manual work with low cognitive involvement.

REPETITIVE TASKS

- Routine work with minimum cognitive involvement

ENVIRONMENT

PEER PRESSURE

- How peer pressure influences job performance

STRESSORS

TIME PRESSURE AND DEADLINES

WORKLOAD

SHIFTWORK

WORKING ENVIRONMENT

- Characteristics and factors affecting working environment

NOISE AND FUMES

- Wanted and unwanted sounds
- How to isolate and protect workers from noise, sound pressure levels, noise induced injuries
- Speech interferences related to noise
- Fumes and its effects on the working place



ILLUMINATION

- Definition of illumination and importance of lighting performing the work
- Guidelines about appropriate lighting levels for various tasks

CLIMATE AND TEMPERATURE

- Human performance related to temperature
- How climate and temperature affects the workspace
- Facility workspace design, clothing and procedures

MOTION AND VIBRATION

- Definition of motion and vibration
- Motion and work platform
- Vibration in Maintenance task

COMPLEX SYSTEMS

- High level of cognitive involvement in human/machine interaction

HAZARDS IN THE WORKPLACE

- The four classes of hazards
- Job hazard identification
- Analysis and evaluation
- Methods to prevent hazards

LACK OF MANPOWER

DISTRACTIONS AND INTERRUPTIONS



PROCEDURES, INFORMATION, TOOLS AND PRACTICES

VISUAL INSPECTION

- Scanning work with medium cognitive involvement

WORK LOGGING AND RECORDING

- Analysis of log books and examples of correct and incorrect entries

PROCEDURE – PRACTICE / MISMATCH / NORMS

TECHNICAL DOCUMENTATION – ACCESS AND QUALITY

COMMUNICATION

DEFINITION OF COMMUNICATION

- Functions of communication
- Communication types: Verbal communication, Non-verbal communication, Written communication (logging)

SHIFT / TASK HANDOVER

DISSEMINATION OF INFORMATION

- Communication and information flows

“CULTURE” DIFFERENCES

- Group norms, differences between engineering and line
- Nationals’ cultural differences and safety

TEAMWORK

RESPONSIBILITY: INDIVIDUAL AND GROUP

- Management’s role
- Technician’s role

TEAM WORKING

- Definition of teams and teamwork in Maintenance
- Teams skills
- Characteristics of an effective team



MANAGEMENT, SUPERVISION AND LEADERSHIP

- Different types of Management and leadership
- Responsibilities of leaders
- Effective team leadership skills

DECISION MAKING

PROFESSIONALISM AND INTEGRITY

KEEPING UP TO DATE, CURRENCY

- Manuals updating and managing communication between shifts work

ERROR PROVOKING BEHAVIOUR

ASSERTIVENESS

ORGANIZATION'S HUMAN FACTORS PROGRAM

REPORTING ERRORS

DISCIPLINARY POLICY

ERROR INVESTIGATION

ACTION TO ADDRESS PROBLEMS

FEEDBACK