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AEROMEDICAL SERVICES

OPERATIONAL AVIATION MEDICINE

Aeromedical Services, Civil Aviation Authority of Sri Lanka.

Operational aviation medicine focuses on addressing the unique health and safety challenges faced by aviation personnel during flight operations.

<u>It is aimed at</u>

- **promoting the health,**
- **well-being of Aviation professionals,**
- **Standardized performance of aviation professionals,**
- **ensuring the safety and efficiency of flight operations.**

Key aspects of operational aviation medicine

Preventive Medicine

- **Implementing preventive measures to minimize the risk of illness, injury, and adverse health effects among aviation personnel.**
- **Providing education and guidance on lifestyle factors, nutrition, physical fitness, and stress management to optimize health and resilience.**

Occupational Health and Safety

Assess and manage occupational hazards and risks associated with aviation duties, including **exposure to noise, vibration, radiation, and hazardous chemicals**.

Conducting workplace evaluations, ergonomic assessments, and safety audits to identify and mitigate potential safety hazards.

Fatigue Management

Developing fatigue risk management programs to address the challenges of fatigue among aviation personnel.

Implementing fatigue mitigation strategies, scheduling practices, and rest requirements to minimize the risk of fatigue-related errors and accidents.

Key aspects of operational aviation medicine

Cabin Air Quality

Monitoring and maintaining cabin air quality to ensure a healthy and comfortable environment for passengers and crew.

Addressing issues related to air contamination, cabin pressurization, humidity levels, and ventilation systems to prevent adverse health effects.

Medical Support Services

Providing medical support services for aviation personnel, including access to medical facilities, emergency medical assistance, and telemedicine consultations.

Establishing protocols for in-flight medical emergencies, medical evacuation procedures, and coordination with ground-based medical resources.

Fitness for Duty Assessments

aeromedical assessments to evaluate the fitness for duty of aviation personnel,

Assessing medical fitness, psychological well-being, and cognitive function to ensure that individuals are capable of performing their duties safely and effectively.

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AEROMEDICAL SERVICES

Key aspects of operational aviation medicine

Environmental Medicine

factors that may impact the health and performance of aviation personnel, such as **high-altitude exposure, extreme temperatures, and solar radiation.**

Providing **guidance on protective measures, hydration, and acclimatization strategies** to minimize the risk of environmental-related health issues.

Emergency Preparedness

Developing emergency response plans and procedures for managing in-flight emergencies, medical crises, and mass casualty incidents.

Conducting training drills, simulations, and exercises to enhance readiness and coordination among aviation personnel and emergency responders.

Regulatory Compliance

Ensuring compliance with regulatory standards and guidelines established by CAA/ICAO.

Adhering to legal requirements, certification standards, and operational protocols to maintain the highest standards of safety and professionalism in aviation operations.

Operational aviation medicine plays a crucial role in promoting the health, safety, and efficiency of flight operations by addressing the unique health challenges and operational requirements of the aviation industry.

By integrating medical expertise, safety management principles, and operational considerations, operational aviation medicine contributes to the overall safety and resilience of the aviation system.

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How to conduct functional tests

Conducting aeromedical functional tests involves assessing an individual's physical and cognitive abilities to perform aviation-related tasks safely and effectively.

These tests are designed to evaluate

- **the functional capacity,**
- **sensory capabilities, and**
- **cognitive function necessary for aviation duties.**

General framework for conducting aeromedical functional tests

1. Preparation

- Review the individual's **medical history, aeromedical assessment findings**, and **specific operational requirements** to tailor the functional tests accordingly.
- Identify the specific functional abilities and skills relevant to the individual's aviation role

2. Selection of Functional Tests

- Choose a variety of functional tests that assess different aspects of physical fitness, sensory function, and cognitive performance.
- Select tests based on their **validity, reliability, and relevance to aviation tasks**, as well as any regulatory or industry standards that may apply.

General framework for conducting aeromedical functional tests

3. Physical fitness assessment

Conduct physical fitness assessments to evaluate strength, endurance, flexibility, and cardiovascular fitness.

Examples of physical fitness tests :

- **Aerobic fitness: Using treadmill or cycle ergometer tests to assess cardiovascular endurance.**
- **Muscular strength and endurance: Performing push-ups, sit-ups, or grip strength tests to evaluate upper body and core strength.**
- **Flexibility: Assessing flexibility through range of motion tests (e.g., sit-and-reach, shoulder flexibility).**
- **Balance and coordination: Conducting balance tests (e.g., single-leg balance, tandem stance) to evaluate stability and coordination.**

General framework for conducting aeromedical functional tests

4. Sensory Function Assessment

Evaluate sensory capabilities, including vision, hearing, vestibular function, and proprioception.

Examples of sensory function tests :

Vision: Conducting visual acuity tests (e.g., Snellen chart) to assess visual clarity and depth perception.

Hearing: Performing audiometric testing to evaluate hearing sensitivity and frequency discrimination.

Vestibular function: Administering vestibular tests (e.g., Romberg test, Dix-Hallpike maneuver) to assess balance and spatial orientation.

Proprioception: Testing proprioceptive awareness and coordination through joint position sense tests (e.g., finger-to-nose test).

General framework for conducting aeromedical functional tests

5. Cognitive Performance Assessment

Assess cognitive abilities and mental function relevant to aviation tasks, including attention, memory, decision-making, and reaction time.

Examples of cognitive performance tests :
Attention and concentration: Using cognitive tasks (e.g., Stroop test, digit span test) to assess sustained attention and concentration.
Memory: Administering memory tests (e.g., word recall, spatial memory) to evaluate short-term and long-term memory function.
Decision-making: Presenting decision-making scenarios or simulations to assess judgment, problem-solving skills, and risk assessment.
Reaction time: Using reaction time tests (e.g., simple reaction time, choice reaction time) to measure the speed of cognitive processing and motor response.

General framework for conducting aeromedical functional tests

6

The intent is to determine the applicant's abilities and limitations to perform safely in the cockpit under normal as well as adverse flight conditions.emergency operations

- adverse weather
- twilight or at night, haze or cloudiness, flight towards the sun
- aided, partially-aided, manual mode

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If an ATC –

Test in the simulator by opting a scenario, this need to be done in collaboration with Air Navigation section. OR actual ATC Centre (Tower, Area Control Centre)

If a Cabin Crew –

Actual Cabin testing – how CCM handle emergency equipment, evacuation procedure handling in an emergency, usage of emergency exits etc.

7. Documentation and Reporting:

Document the results of the functional tests, including objective measurements, observations, and any relevant clinical impressions.

Provide clear and concise reporting of the individual's functional abilities, highlighting strengths, weaknesses, and any areas of concern.

Include recommendations for aeromedical certification, fitness for duty, or any necessary follow-up assessments or interventions.

8. Feedback and Counseling:

Provide feedback to the individual on their performance in the functional tests, including strengths, areas for improvement, and any implications for aviation duties.

Offer counseling and guidance on strategies for optimizing physical fitness, sensory function, and cognitive performance to enhance aeromedical fitness and safety in aviation operations.

9. Follow-Up and Monitoring:

If necessary establish a plan for ongoing monitoring and follow-up to track changes in the individual's functional abilities over time.

Schedule periodic re-evaluations and reassessments as needed to ensure continued compliance with aeromedical standards and regulatory requirements.

10. If the Candidate performed functional test satisfactorily – fit certification with OR without limitation/restrictions.

By following this structured approach to conducting aeromedical functional tests, Medical Assessors and aviation medical examiners can effectively assess the physical, sensory, and cognitive abilities of individuals involved in aviation activities and **make informed decisions regarding their aeromedical fitness for duty**.

It's essential to **prioritize safety, accuracy, and compliance with regulatory standards** throughout the assessment process.

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Operational area orientation

Operational area orientation involves familiarizing AMEs & MAs with the specific working environment of Licence Holders in which they will be performing their duties.

This includes understanding the physical layout, operational procedures, potential hazards, and safety protocols relevant to their role.

When evaluating aeromedical fitness in relation to the working environment, it's important to consider how various factors within the operational area may impact the health and well-being of license holders.

1.2.4.6.2 Medical examiners shall have practical knowledge and experience of the conditions in which the holders of licences and ratings carry out their duties.

Note.— Examples of practical knowledge and experience are flight experience, simulator experience, on-site observation or any other hands-on experience deemed by the Licensing Authority to meet this requirement.

Operational Area Orientation

Essential to have a comprehensive orientation program for AMEs & MAs to familiarize them with aviation operational areas

Gather information on the layout of the facility, access routes, emergency exits, and safety equipment.

Review operational procedures, protocols, and standard operating procedures (SOPs) relevant to the Licence Holder's role.

Observe potential hazards, safety risks, and emergency response procedures specific to the operational area.

Environmental Assessment

Assess environmental factors within the operational area that may impact the health and safety of license holders.

Consider factors such as noise levels, vibration, temperature extremes, humidity, lighting conditions, air quality, and ergonomic factors.

Identify any environmental hazards or exposures that may pose risks to physical or mental health, such as exposure to hazardous chemicals, radiation, or infectious agents.

Physical Demands Analysis

Evaluate the physical demands of the operational area and the tasks performed by license holders.

Assess requirements for lifting, carrying, pushing, pulling, standing, sitting, walking, and repetitive movements.

Consider **ergonomic principles and workplace design** to minimize physical strain and reduce the risk of musculoskeletal injuries.

Mental and Cognitive Demands

Analyze the mental and cognitive demands of the operational environment, including workload, stressors, and cognitive performance requirements.

Evaluate factors such as attention, memory, decision-making, situational awareness, and response to time-critical tasks.

Consider the impact of high-pressure situations, multitasking, and cognitive fatigue on the performance and well-being of license holders.

Health Risk Assessment

Consider health risks assessment to identify potential health risks associated with the working environment.

Consider individual susceptibility factors, such as age, medical history, pre-existing conditions, and lifestyle factors.

Assess the cumulative impact of environmental exposures, occupational hazards, and job-related stressors on the overall health and well-being of license holders.

Aeromedical Evaluation

Integrate the findings of the environmental assessment and health risk assessment into the aeromedical evaluation process.

Consider how environmental factors may interact with individual health status and functional capacity to affect aeromedical fitness.

Evaluate the **individual's ability to adapt to and perform safely** within the operational environment, taking into account any identified risks or limitations.

By conducting operational area orientation and evaluating aeromedical fitness while analyzing the impact of the working environment, AMEs & MAs can proactively identify and mitigate health risks, promote the well-being of license holders.

It's essential to integrate environmental considerations into the aeromedical evaluation process to address the complex interplay between individual health, occupational hazards, and operational requirements.


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THANK YOU!