Midterm Review

1. Ergonomics
   1. History and Origins
   2. Ergonomics and Human Factors
      1. Ergonomics: 1. How work effects people 2. Reduce fatigue
      2. Human factor: 1. Human machine interface 2.Reduce the potential for human error
   3. Risk Factors
      1. Frequency
      2. Awkward posture
      3. Forceful exertion
      4. Static posture
      5. Mechanical contact
      6. Stress
      7. Temperature
      8. Vibration
      9. Duration
   4. Other Factors
      1. Obesity epidemic
      2. Opioid addiction epidemic
      3. Aging workforce
      4. Fitness for duty
      5. Gender
   5. Ergonomic Controls
   6. Ergonomic Programs
      1. Management commitment
      2. Worker involvement
      3. Worksite analysis
      4. Medical management
      5. Training and education
      6. Ongoing evaluation
   7. Problem Solving Process
      1. Identify jobs with ergonomics opportunities
      2. Defining the job demands
      3. Identify risk factors by body part for each task of concern
      4. For each risk factor, ask why it is present until a dead end is reached
      5. Develop strategies for how to address the root causes and generate at least three solutions for each task of concern
      6. Choose the solutions that will ubstantially reduce the ergonomics problems and be withing the affordable cost guidelines for the plane
2. CTDs and MSDs
   1. Fatigue vs Recovery Curve
   2. Types of MSDs
      1. Cartilage: Absorb shock to protect the bone
      2. Nerves: Control voluntary and involuntary movement
      3. Muscle Pain: Cramp, Delayed Onset Muscle Soreness, Chronic exposure to static loads prevents proper recovery and can lead to permanent damage
      4. Tendon-Strain: A strain is an injury to a tendon due to repetitive movements and awkward posture
      5. Strains and sprains: Inflammation is a natural protective response, including tenosynovitis, tendonitis, bursitis, planter fasciitis and Achilles’ tendonitis
   3. Symptoms
   4. Causes
   5. Check list
      1. Pain/Strain/Sprain/Inflammation
      2. Tendonitis/Epicondylitis
      3. Bursitis
      4. Nerve Compression
      5. Blood Vessel Compression
      6. Neuritis
      7. Carpal Tunnel Syndrome
      8. Cubital Tunnel Syndrome
      9. Guyon Tunnel Syndrome
      10. DeQuervain’s Syndrome
      11. Gangglion Cysts
      12. Neck Tension Syndrome/Anterior Head
      13. Pronator Teres
      14. Thoracic Outlet Syndrome
      15. Trigger Finger
      16. Reynauyd’s Disease (White Finger)
3. Physical and Environmental Stressors
   1. Lighting and color
      1. Lighting design
         1. Light best provided by combination of ambient room lighting band specific task lighting
         2. Design must balance illumination levels with implementation and operation cost
         3. Selection should consider “color rendering”
      2. Lamp types
         1. Incandescent
         2. Fluorescent
         3. High intensity discharge(mercury vapor, metal halide, high pressure sodium)
         4. Low pressure sodium
      3. Lighting and quality issues
         1. Glare: exceptionally brilliant and distracting or uncomfortable amount of light
         2. Shadows: The opposite of glare
         3. Room appearance: Balance the brightness of room walls and ceilings
         4. Natural sunlight
         5. Age of user
      4. Light reflective values
      5. 5’s factory
         1. Sort
         2. Set in order
         3. Shine
         4. Standardize
         5. Sustain
   2. Noise
      1. Contributes to hearing loss
      2. Noise levels
      3. Interference
      4. Approaches to reducing noise in the workplace
   3. Thermal conditions
      1. Thermal stressors
      2. Thermal environments
      3. Heat stress
      4. Cold stress
      5. Thermal condition assessment
      6. Thermal comfort zone
      7. Heat stress controls
      8. Cold stress controls
   4. Vibration
      1. Vibration injuries
      2. Vibration measurement
      3. Vibration controls
   5. Ventilation
      1. Ventilation rate
      2. What are the effects of CO2
      3. Measuring and reducing CO2
4. Anthropometry
   1. History and origins
   2. Factor affecting anthropometry
   3. Work design or modification
   4. Designing for the maximum, the average, the minimum population or adjustable range
   5. Expected value, percentiles, and all calculations
   6. Grips’s types
5. Biomechanics
   1. Definition
      1. Science of Human Movement
      2. MSD’s and human error prevention
   2. Types of body movements
      1. Flexion: A movement of a segment of the body causing a decrease in the angle at the joint
      2. Extension: A movement in the opposite direction of flexion which causes an increase in the angle of the joint
      3. Abduction: A movement of a body segment in a lateral plane away from the midline of the body
      4. Adduction: A movement of a body segment toward the midline as when moving the arm from the outward horizontal position downward to the vertical position
      5. Rotation: The movement of a segment around its own longitudinal axis
         1. Medial rotation: toward the midline of the body
         2. Lateral rotation: away from the midline of the body
   3. Classes of movement
      1. Discrete movements: A singular reaching movement to a stationary target
      2. Repetitive movements: Repetition of a single movement to a stationary target
      3. Sequential movements: Discrete movements to a number of stationary targets regularly or a regularly spaced
      4. Continuous movements: Require muscular control adjustments to some degree during the movement
      5. Static posturing: Maintaining a specific position of a body member for a period of time
   4. Pressure 
   5. Lever systems
      1. First class lever: Pivot is in the middle
      2. Second class lever: Load is in the middle
      3. Third class lever: Effort is in the middle
   6. All calculations