DEPARTMENT OF THE AIR FORCE
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AIR FORCE SPECIALTY CODE 4B071
BIOENVIRONMENTAL ENGINEERING

Ergonomics

QUALIFICATION TRAINING PACKAGE

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STS Line Item 4.11.4: Recommend controls

TRAINER GUIDANCE

Proficiency Code:	3c
PC Definition:	Can do all parts of the task. Needs only a spot check of completed work. Can identify why and when the task must be done and why each step is needed.
Prerequisites:	N/A
Training References:	• *Fundamentals of Industrial Hygiene* • AFI 91–203, *Air Force Consolidated Occupational Safety Standard*.
Additional Supporting References:	N/A
CDC Reference:	4B051
Training Support Material:	N/A
Specific Techniques:	Conduct hands-on training and evaluation.
Criterion Objective:	Given a situation, perform an ergonomic assessment and recommend appropriate controls successfully completing all performance checklist items with NO instructor assistance.
Notes:	

TASK STEPS

1. Identify work area and/or tasks of concern during initial/routine assessments and/or workplace analysis[1] and/or occupational illness/injury investigations.
2. Annotate initial observations into DOEHRS and include ergonomic survey follow-up requirements into special surveillance program.
3. Schedule/perform Ergonomics Assessment utilizing a user-defined approach. This can be in the form of a *work-methods study*[2] and/or the use of a checklist.[3]
4. Using the methods in task step 3, identify possible ergonomic risk factors.[4]
5. Recommend ergonomic controls using the hierarchy of controls[5] rule of thumb.
6. Utilize DOEHRS as necessary to document further observations/findings/recommendations.

LOCAL REQUIREMENTS:

NOTES:

1. Workplace Analysis: The American Industrial Hygiene Association (AIHA) describes workplace analysis as the examination of the workplace to identify existing hazards as well as the conditions and operations in which changes might occur to create hazards. A workplace analysis can be considered a HRA. The determination to perform a workplace analysis can be driven by an occupational illness/injury investigation, worker's complaint, or merely part of a walkthrough survey to identify hazards proactively. In addition, follow-up surveys to evaluate the effectiveness of control measures will also be conducted. In general, the fundamental elements of a workplace analysis are similar to the HRA process: identifying, evaluating, and implementing *courses of action* to reduce risk to human health.

2. Work-Methods Study: Can be described as the systemic recording of existing and proposed ways of doing work accompanied with the critical examination of data. Describing the job in a series of "elements" (e.g., reach, hold, assemble, inspect) can help the observer determine which ones may be risk factors for musculoskeletal disorders. Once the "elements" that can increase the probability are identified, recommended solutions can be assigned.

3. Checklists: Like one found in DOEHRS, are another way to gather information. A checklist is easy to use because it involves a "qualitative" method that quickly evaluates job risk factors. However, checklists are not "quantitative" and in some instances they may not tell what the "real" risk factors are. A good checklist will provide BE technician with enough detail that they are able to derive an effective solution. Remember that checklists are not a substitute for a BE technician's best tool, their brain. Use checklists as a guideline and reminder tool.

4. Risk factors include but are not limited to:
    a. Repetition
    b. Force
    c. Posture
    d. Static Loads
    e. Mechanical stress
    f. Temperatures
    g. Vibration
5. Controls include but are not limited to:

a. Engineering Controls
    i. Engineering controls are the preferred method for controlling ergonomic risk factors because engineering controls are permanent and, typically, more effective than administrative controls, or PPE. Ergonomic engineering controls generally work by changing the workplace to fit the worker. The workspace design should accommodate the wide range of people assigned to the task.
    ii. Engineering controls include modifying, redesigning, or replacing:
        1. Work stations and work areas
        2. Materials/objects/containers
        3. Hand tools
        4. Equipment

b. Administrative Controls
    i. Administrative controls deal with how work is structured. Examples of administrative controls include:
        1. Proper maintenance and housekeeping: Proper housekeeping can reduce or eliminate awkward posture associated with extended reaches, bending or twisting when handling materials, tools or other objects. Floor surfaces should be kept free of slipping or tripping hazards. Cutting tools should be kept sharp; dull cutting surfaces require increased force to use.
        2. Job rotation and enlargement: This involves rotating workers through different jobs or enlarging jobs to incorporate different muscle groups, reduce repetition, and reduce mental demands.
        3. Work scheduling: Work scheduling can help avoid excessive overtime or extended workdays. Scheduling should take into account the fact that shift work can cause fatigue and thereby increase the risk of ergonomic related injury.
        4. Sufficient breaks: Instituting work-rest cycles with adequate recovery time can reduce fatigue and risk of ergonomic related injury. Short work/break cycles are best to reduce fatigue.
        5. Work practice: Work practice focuses on the way work is performed. Examples of work practice controls include:
        6. Modifying work procedures and practices to ensure that neutral working posture and safe work techniques are used
        7. Gradual introduction to work for new and returning employees
        8. Worker-controlled pace and organization to reduce worker fatigue and exposure to risk factors
        9. Training: Training personnel to use safe working postures and techniques is important, along with monitoring to make sure that modified work practices are being used. However, training on proper lifting or carrying methods is not necessarily the most effective way to control ergonomic hazards. The use of engineering controls and the elimination of handling materials is the most effective means to reduce or eliminate ergonomic related injuries.

c. Personal Protective Equipment (PPE)
    i. Personal Protective Equipment should be used as the principal means of control only as a last resort, when neither engineering nor administrative controls are possible, or in the event of emergencies. It is considered the least effective form of ergonomic hazard control. The PPE does not eliminate the hazard or reduce the time of exposure. It simply reduces the amount of hazardous exposure by placing a barrier between the hazard and the worker. The most effective method of reducing or eliminating ergonomic hazards is to fix the hazard, not the worker, through engineering and administrative controls.

TRAINEE REVIEW QUESTIONS

STS Line Item 4.11.4: Recommend controls

1. Identify some simple inexpensive ergonomic controls in the image below.

Do you see opportunities for ergonomic controls at this office work center?

Engineering Controls

Administrative Controls

PPE Controls

2. Identify some simple, inexpensive ergonomic controls examples in the image below.

Do you see opportunities to improve the ergonomic methods used at this industrial work center?

Engineering Controls

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Administrative Controls

PPE Controls

PERFORMANCE CHECKLIST

STS Line Item 4.11.4: Recommend controls

Proficiency Code:	3c
PC Definition:	Can do all parts of the task. Needs help only a spot check of completed work. Can identify why and when the task must be done and why each step is needed.

DID THE TRAINEE…	YES	NO
1. Identify work area and/or tasks of concern during initial/routine assessments, and/or workplace analyses, and/or occupational illness/injury investigations?		
2. Annotate initial observations into DOEHRS and include ergonomic survey follow-up requirements into special surveillance program?		
3. Schedule/perform Ergonomics Assessment utilizing a user-defined approach?		
4. Using the methods in task step 3, identify possible ergonomic risk factors?		
5. Recommend ergonomic controls using the hierarchy of controls rule of thumb?		
6. Utilize DOEHRS as necessary to document findings/recommendations?		
Did the trainee successfully complete the task?		

TRAINEE NAME (PRINT)

TRAINER NAME (PRINT)

ANSWERS

1. Identify some simple inexpensive ergonomic controls in the image below.

Do you see opportunities for ergonomic controls at this office work center?

A:

Engineering Controls

Recall that engineering controls include modifying, redesigning, or replacing work stations, work areas, materials/objects/containers, hand tools, and equipment.

1. The computer screen is too low for the worker and the worker is required to look down, placing strain on neck and shoulders. Recommended control is to raise computer screen height.
2. The key board is too far from the worker, requiring her to reach. Recommended control is to pull the key board closer to the worker reducing strain and stress on arms, shoulders and neck.

Administrative Controls

Recall that administrative controls include proper maintenance and housekeeping, job rotation and enlargement, work scheduling, sufficient breaks, work practice, and training

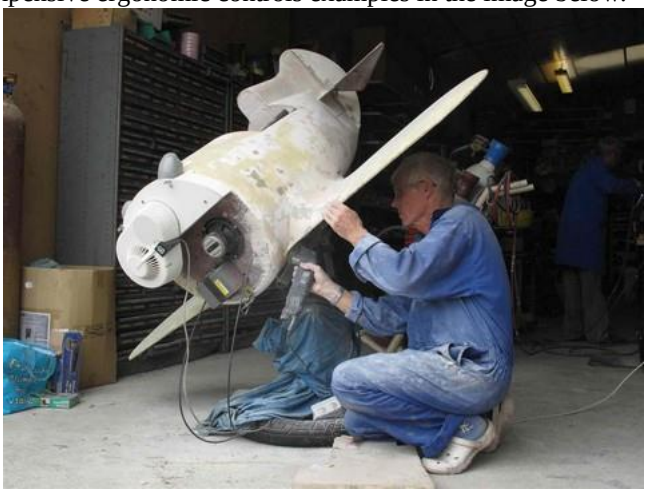
1. The housekeeping of the worker's desk needs to be improved so that work equipment is placed in convenient locations to prevent reaching.

2. If the worker sits for extended periods, recommend taking periodic breaks away from computer screen to reduce strain on eyes and wrist.

PPE Controls

Personal protective equipment controls should be used as a last resort.

2. Identify some simple, inexpensive ergonomic controls examples in the image below.



Do you see opportunities to improve the ergonomic methods used at this industrial work center?

A:

Engineering Controls

1. Stooping and squatting places a great deal of pressure on legs and back. Recommended control would be to use a stool or even sit on the ground.
2. The position of the piece of equipment is causing the worker to work around it in unique positions. Recommend moving the equipment.

Administrative Controls

1. Recommend keeping floor surfaces free of slipping or tripping hazards. Recommend keeping cutting tools sharp; dull tools may increase the force required to use them.
2. Recommend rotating workers through performing this task to rest the different muscle groups of the body, reduce repetition, and reduce mental demands.
3. Recommend instituting work-rest cycles with adequate recovery time to reduce fatigue and risk of ergonomic related injury.

PPE Controls

Recommending PPE should be used as a last resort.

(Source: AFI 91–203, *Air Force Consolidated Occupational Safety Standard*)