Basic Ergonomics for Logistics and Transport Operations

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Types of Ergonomics

• 3 main types:
  – **Physical**
    • Concerned with human anatomical, anthropometric, physiological and biomechanical characteristics as they relate to physical activity. This includes working postures, materials handling, repetitive movements, work-related musculoskeletal disorders, workplace layout, safety and health.
  – **Cognitive**
    • Concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system. This includes mental workload, decision-making, skilled performance, human-computer interaction, human reliability, work stress and training as these may relate to human-system design.
  – **Organisational**
    • Concerned with the optimization of socio-technical systems, including their organizational structures, policies, and processes. This includes communication, crew resource management, work design, design of working times, teamwork, organizational culture, telework, and quality management.
Scope

• Ergonomics of Standing

• Basic Manual Material Handling

• Ergonomics of Driving
Ergonomics of Standing

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Standing

• Body uses energy to maintain
  – posture
  – balance

• Some element of discomfort
  – “static” muscles
  – venous pooling
Fatigue of Standing

Combination of “front” and “back” muscles

Figure 6.14. The major antigravity muscles that maintain the erect posture.
Features of Good Standing Postures

Asymmetric Loading
Alternating Loading
Spinal Position
Dynamic Stability
Anti-fatigue Mats

• How do they work?
  – Have you noticed that it is more tiring to stand on concrete than to stand on grass/soil?
  – Hard surfaces tend to promote static standing
    • muscle stiffness
    • venous pooling
  – Anti-fatigue mats work by promoting dynamic stability
Basic Manual Material Handling

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Seven Basic Tips

Tip One: Lift heavy objects with your legs or hips, not your back.

WRONG – back is bent over
CORRECT – back is kept straight
CORRECT – use legs to generate the power to lift when carrying heavy loads
Lifting

• Most mature workers will prefer the hip lift over the leg lift
Seven Basic Tips

Tip Two: Carry heavy loads correctly

- a. Keep back straight
- b. Keep load between shoulders and hip
- c. Keep load close to your body
Seven Basic Tips

Tip Two: Carry heavy loads correctly

d. Backloads must not lead to over bending of back

NOT Acceptable

NOT Acceptable

Acceptable
Seven Basic Tips

Tip Three: If load is greater than 23kg, get assistance to lift and move it.

Mechanical Assistance  Manpower Assistance
Seven Basic Tips

Tip Four: Avoid twisting the body when carrying loads
Seven Basic Tips

Tip Five: Avoid unbalanced or unstable loads. They are at high risk of causing injury.
Seven Basic Tips

Tip Six: Avoid working ABOVE your shoulder height. Use step ladders, stepping stools or work platforms to reach high areas.

Excessive neck and arm tilt can lead to pain in neck and shoulders
Seven Basic Tips

Tip Seven: Pushing loads is better than pulling loads.

Pulling uses 3x more effort than pushing!
Ergonomics of Driving

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What we know

• If you drive more than 20 hours/wk, increased risk of WRMSD.

• Drivers are a greater risk of lower back pain than office or standing jobs.
  – Added vibration
  – Static/ constrained posture

• Less discomfort is reported in drivers with vehicles that have more adjustable features:
  – Lumbar support
  – Seatpan angle
  – Steering wheel
Main causes of discomfort

• Posture
  – Poor habits
  – Poor vehicle design

• Stress/ Tension

• Vibration
Example
Examples

Backrest wrongly adjusted

Poor design: Extended arms
Common postural problems

Mr Cool

Ms Tense

Mr Racer
Neutral position

Teaching drivers how to properly adjust their seats/ posture is important.
Relieving Tension

• Periodic stretching exercises

• Breathing exercises
ComfortDelGro taxi drivers get customised healthcare scheme under HPB partnership

SINGAPORE – The Health Promotion Board (HPB) has partnered ComfortDelGro to bring a free healthcare and screening programme to its pool of taxi drivers.

The scheme will provide the drivers with an initial health screening, followed by a seven-month health counseling and coaching programme customised to each individual's health conditions.

To make it more convenient, the programme will be rolled out at ComfortDelGro's Taxi Service Centre so drivers can participate in the initiative while waiting for their cars to be serviced, the HPB and ComfortDelGro said in a joint statement.

More than 375 drivers have participated since the programme began on June 16.

Drivers are screened for blood glucose, blood cholesterol and blood pressure levels, and their body mass indexes are measured. They also complete a lifestyle survey.

Based on the results, drivers will then spend the next seven months being coached one-on-one by nurses, who will plan simple goals to improve their health. There will also be lunchtime health management workshops twice a week on topics such as the ergonomics of driving, where nurses demonstrate the correct sitting posture to adopt while driving.

Other workshops include fatigue management, nutrition, physical activity, mental well-being and smoking cessation.

At the end of seven months, drivers will undergo a second health screening and lifestyle survey to determine if there has been any improvement to their health status.

ComfortDelGro operates about 18,600 Comfort and CityCab taxis in Singapore, with 34,000 drivers.
Vibration

• Harder to control
  – Cushions
  – Regular servicing/ newer vehicles
  – Anti-vibration gloves
END