

Noise and Vibration



Objectives

1. Identify the characteristics of sound and how they contribute to hazardous noise exposure.
2. Identify the effects of hazardous noise.
3. Identify the protective measures used to minimize hazardous noise exposure
4. Select the symptoms or conditions that may result from prolonged exposure to aircraft vibration.

Preview

- Perception of Sound
- Characteristics of Noise
- Effects of Hazardous Noise
- Protection from Noise
- Vibration

Noise

Definition and Characteristics

- Definition — **unwanted** sound
- Characteristics
 - Frequency
 - Intensity
 - Duration

Intensity

Approximate Noise Levels (decibels)

	140	→	Jet Engine (near)
Jet Takeoff (100 feet)	130		Shotgun firing
Boom Box	120		Rock Concert
Jackhammer	110		Chain Saw (gas)
Arcade game parlor	100		Radio Headset
Motorcycle	90		Lawnmower (5 feet)
City Traffic Noise	80		Hair Dryer
Dishwasher	70		Vacuum Cleaner
Inside Car (windows up)	60		Normal Conversation
	50		Quiet Office
Refrigerator Humming	40		Living Room
Broadcasting Studio	30		Whisper
Hearing Test Booth	20	←	Rustling Leaves
Sounds Just Audible	10		Normal Breathing
	0		

Sources of Noise

- Propeller
- Jet
- Helicopter
- Ground Support Equipment

Duration

Limiting Values For Total Daily Exposure

Duration	Noise Level (dBA)
8 hrs	85
6 hrs	86
4 hrs	88
2 hrs	92
1 hr	96
45 mins	98
30 mins	100
15 mins	104
7.5 mins	108
3.75 mins	112
2.23 mins	115

Effects of Noise

- Conductive Hearing Loss
- Sensory Hearing Loss
 - Temporary Threshold Shift
 - Permanent Threshold Shift
- Non-Auditory Effects

Protection

- Ear Plugs
- Headsets
- Helmets
- Ear muffs
- Combinations
- Active noise reduction

Aircraft Vibration

Vibration – Rapid movement of an object in a back and forth motion.

Vibration is described with the same parameters as sound — Frequency, Intensity, and Duration



Vibration

Effects on Performance

- Tracking
- Reaction Time
- Visual Impairment
- Fatigue

Vibration

Symptoms of Exposure

- Loss of appetite
- Complacency
- Perspiration
- Salivation
- Nausea
- Headache
- Vomiting

Vibration

Strategies to Reduce Effects

- Stretch / Warm-Up
- Avoid One Prolonged Position
- Choice Of Seat
- Lumbar Support
- Use Of Seat Harness
- Physical Condition

