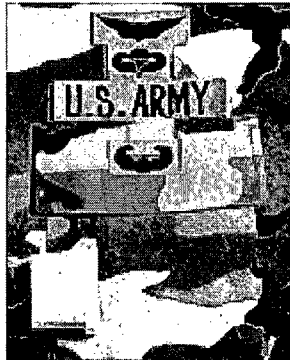




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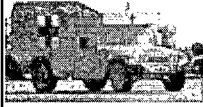

Noise Levels of Common Army Equipment

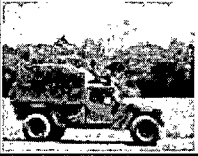






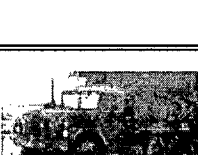

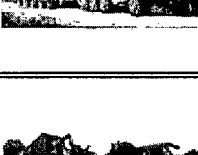
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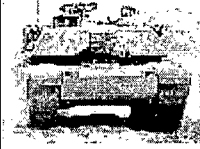

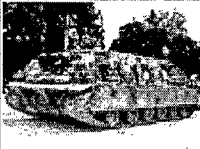
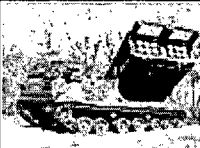
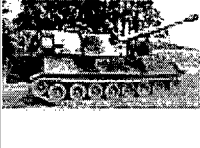


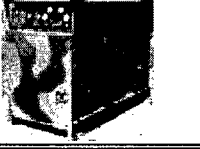

The sound levels listed in tables A-1 and A-2 are the highest typical measured values under normal operation. For most items of equipment there may be several normal operating conditions. Each condition generates a different noise level. For example, there is a 5 to 10 dB difference in noise at the driver position of a truck depending on window closure and auxiliary equipment such as heater fans. There can also be some variation among individual units of the same type of equipment. Different test reports may list somewhat different levels.

Table A-1

STEADY NOISE

Photo	Model	Name, Condition	Location	Speed km/hr or (mph)	Sound Level dB(A)
	M966, also: M996 M997 M998 M1037 and other non-heavy	High mobility multi-wheeled vehicle (HMMWV), at 2/3 payload	Crew positions	0(idle)	78
				48(30)	84
				88(55)	94
	M996 M997	HMMWV mini and maxi ambulance, at 2/3 payload	Patient areas	up to 88 (55)	less than 85
	M1097 M1097A2 M1113 M1114	HMMWV heavy variants, at 2/3 payload	Crew positions	up to 50 (31)	less than 85
				64(40)	88
				80(50)	92
				96(60)	98
	M1097	HMMWV heavy variant, at full	Crew positions	up to 40 (25)	less than

		payload		96(60)	85 100
	M1008 M1009 M1010 M1028	Commercial utility cargo vehicle (CUCV)	In cab	below 88 (55) 88(55)	less than 85 85 to 91
	M1010	Ambulance	Patient Areas	all speeds	below 85
	M1080 chassis, includes M1078 M1079 M1081	Light medium tactical vehicles (LMTV 2 1/2 ton trucks), 2/3 payload	In cab	0 idle 72(45) 75(46) 88(55)	80 84 85 89
	M1092 and M1096 chassis, except M1089 wrecker	Medium tactical vehicles (MTV 5 ton trucks), 2/3 payload	In cab	0 idle 72(45) 75(46) 88(55)	80 84 85 89
	M1089	5 ton wrecker, towing, 2/3 payload	In cab	up to 48 (30) 56(35)	less than 85 87
	M984E1	Heavy Expanded Mobility Tactical Truck (HEMTT)	In cab	64(40) and below 72(45)	below 85 93.1
	M44A3 series includes M35A3 M35A3C M36A3	2 1/2-ton truck, extended life program (ESP), 2/3 payload	In cab	Idle 16(10) 32(20) 80(50)	72-81 85 87 97
	M1070	Heavy Equipment Transporter (HET), loaded	In cab	All speeds	Below 85
	M1074 M1075	Palletized load system, 16.5 tons	In cab, windows closed Windows open	All speeds 88(55) below 88(55)	85 or below 87 below 85
	M113A3 family including	Armored Personnel Carrier A3 version. M113, M113A1, M113A2, OSV(BMP2) have		Idle 16(10)	85-92 106

	M106A2 M1064A3 M1059A3 M58A3 M730A2 M901A3 M981A3	similar noise levels		32(20) 48(30) 63(40)	109 114 118
	M1A2, M1, M1A1 M1 chassis similar	Abrams tank Grizzly breacher, Wolverine Heavy assault bridge (HAB)	In vehicle	Idle Tac idl 16(10) 48(30) 63(40)	93 103 108 114 117
	M2A2 M2, M3, M2A1, M3A1, M3A2 similar	Bradley Fighting Vehicle	In vehicle	Idle 16(10) 32(20) 61(38)	74-95 110 115 115
	M88A2	Hercules recovery vehicle	In vehicle	various	89 to 106
	M270	Multiple Launch Rocket System (MLRS) vehicle	In vehicle	Idle Moving, various speeds	83-98 99 to 111
	M109A3E2 other versions similar	Paladin, 155 mm self propelled howitzer	In vehicle	Idle Moving, various speeds	83-98 99 to 111
	MEP-802A	5 kW Tactical Quiet Generator (TQG)	Operator panel	Rated load	80
	MEP-803A	10 kW TQG	Op panel	Rated load	81
	MEP-804A	15 kW TQG	Op panel	Rated load	84
	MEP-805A	30 kW TQG	Op panel	Rated load	84
	MEP-806A	60 kW TQG	Op panel	Rated load	87

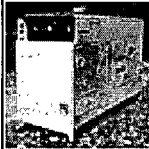
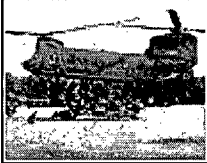



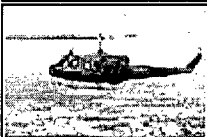















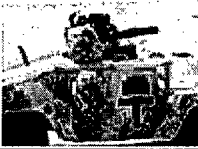
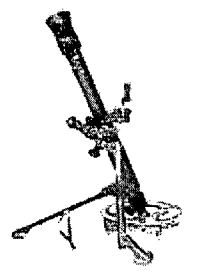
					
	CH-47D	Chinook helicopter	Cockpit		102.5
	UH-60A	Blackhawk helicopter	Pilot copilot		106 106
	YAH-64	Apache helicopter	Pilot copilot		104 101.3
	OH-58D	Kiowa helicopter	Right seat Left seat		101.6 100.3
	UH-1H	Huey helicopter	Pilot/copilot Max in rear		101.9 102.9

Table A-2

IMPULSE NOISE

Photo	Model	Name	Location	Sound Level dB(P)
	M16A2	5.56mm rifle	Shooter	157
	M9	9mm pistol	Shooter	157
	M249	5.56mm Squad Automatic Weapon (SAW) fired from a HMMWV	Gunner	159.5
	M60	7.62mm machine gun fired from a	Gunner	155

		HMMWV		
	M2	0.50 caliber machine gun fired from a HMMWV	Gunner	153
	MK 19 Mod 3	machine gun fired from a HMMWV	Gunner	145
	M26	Grenade	At 50 ft	164.3
	M3	MAAWS recoilless rifle	Gunner	190
	M72A3	Light Antitank Weapon (LAW)	Gunner	182
		JAVLIN	Gunner open Position	159.9
			Gunner enlosed position	166.2
			Gunner fighting position	172.3
	M119	105MM towed howitzer at charge 8	Gunner	183
	M198	155mm towed howitzer firing M203 propellant	Gunner	178
	M109A5/6	Paladin, 155mm self propelled howitzer firing M4A2 zone 7 charge	In fighting compartment, hatches open except driver's	166.1
	M110A2	8-inch self propelled howitzer firing M106 projectile with a M188A1 zone 9 propelling charge,	Gunner	176.9
	M224	60mm mortar, M888 round, charge 4, QE 800 mil	0.5 m from the muzzle, 0.9 m above ground, 105 degree azimuth	185

				
		TOW II Missile from HMMWV	Gunner	179.4
	M29A1	81 mm mortar, M374A3 round with charge 4	1 m from the muzzle, 0.9 m above ground, 135 degree azimuth	178.8

A-2. *Characteristics of individual equipment noise.* The following paragraphs summarize noise exposure considerations for common Army equipment:

a. *Trucks and High Mobility Multi-wheeled Vehicles (HMMWV).* Noise levels increase with increasing speed and, for HMMWV, with increasing load. The levels are below 85 dBA at low to medium speeds and can be over 100 dBA at top speed for some models. When driven mostly at low speeds with short periods at moderate or high speed trucks and HMMWVs are not hazardous. They can be hearing hazards to unprotected soldiers if operated for long time periods at high speed.

b. *Bradley Fighting Vehicle (BFV) and derivatives.* The major noise source is the drive train, particularly the action of the track links as they round over the sprockets, idlers and wheels. For this reason, high noise levels (101 to 115 dBA) occur when the vehicle is in motion. The crew wear the combat vehicle crewman's (CVC) helmet which has integral hearing protectors. A CVC with active noise reduction (ANR) providing added noise protection is available on newer models. The passengers (infantry squad) must rely on their own hearing protectors such as earplugs. These are less effective than the CVC with ANR. For training, the exposure time in moving carriers is restricted depending on the hearing protectors worn and the speed of the vehicle. The severest restriction is on exposure of passengers wearing the less effective earplugs.

c. *M113 Armored Personnel Carrier and derivative vehicles.* Among the loudest of Army equipment. Noise sources and hearing protection are similar to the BFV. Levels are very high when moving.

d. *Abrams Tank and derivative vehicle (Wolverine and Grizzly).*

(1) Steady noise levels range from 96 to 117 dBA when moving. The crew wear the CVC helmet which has integral hearing protectors.

(2) On the tank, impulse noise levels at exterior commander and loader positions are above or just below the limit of hearing protector effectiveness for training depending on caliber (105 or 120 mm), cartridge model, and tube elevation. The drivers hatch should be closed at all times when firing the main gun. Training with crew heads above the hatch plane is not permitted per the user manuals for certain defined conditions. These restrictions are not applicable to battle situations.

e. *Helicopters.* In flight, helicopter crews wear the helicopter crew helmets which have integral hearing protectors. Passengers must rely on their own hearing protectors such as earplugs or ones supplied by the air operations. Training restrictions on exposure time apply, as discussed for the BFV.

f. *Generators.* Diesel powered generators form the Tactical Quiet Generator (TQG) series are quiet at the operator panel and other close-in areas if the covers are in place. Older generators have been loud with levels above 100 dBA at the panel and above 85 dBA up to several meters away. High levels are generated by TQG if the covers are removed. See (**Figure 2**). for comparison of the noise impact from generator types.

For additional information click here

g. *Impulse noise from weapons.* All firearms produce impulse noise levels requiring hearing protection at crew positions for training. Some produce levels under certain conditions, which exceed the safe training limit for crews wearing hearing protectors.

(1) Small arms- rifles pistols, machine guns, and 40 mm grenades. Noise levels at gunner positions are low to moderate. The hazard can be serious because of the large number of rounds that can be fired by the individual shooter. Noise levels are higher in front and to the side of the muzzle than to the rear. For small arms levels at about 5 feet to the side can be higher than at the shooter position. Except very near the muzzle, all levels are within the mitigation capability of hearing protectors.

(2) Mortars. Noise levels range from low to very high because of the wide variation in charge increments and head locations. The requirement to load the cartridge through the muzzle places the head close to the muzzle, which is the source of the impulse. For the top charge on the large ground mount mortars, a safe noise level for training occurs only at 2 m from the muzzle, no higher than 0.9 m above ground. Some mortars include a funnel-shaped blast-attenuating device on the muzzle.

(3) Howitzers without fighting compartments. For the 155 mm towed and 8-inch self-propelled howitzers the levels are medium to high depending on the charge increment, but are below the training exposure limit for protected soldiers.

(4) Howitzers with fighting compartments. For the 155 mm self propelled howitzer the walls of the fighting compartment tend to attenuate the peak levels but the reverberation within the compartment aggravate the noise exposure. For some higher charges the front, top, and side hatches should be closed during training fire.

(5) Tanks. The levels above the turret hatches can be very high for some cartridges and at some tube elevations. For these, training fire with crew heads above the hatch plane is not recommended. Levels below the hatch plane, even with the hatch open, are lower.

(6) Rocket launcher vehicles. Impulse noise in the MLRS, Avenger, and FOG-M launchers are low to medium.

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