

GTA 07-09-002

For Official Use Only

Reference: FM 7-31, 14 FEB 2011

Mine Resistant Ambush Protected (MRAP) Family of Vehicles Operational Safety Card

Conducting a mission with MRAP requires the entire crew to rapidly think and adapt to any situation. Improper mission preparation and maneuvering through harsh terrain can be as deadly as being in contact with the enemy. As a crew, you must know how to determine slope, negotiate unimproved roads, and move through congested civilian traffic. This graphic training aid assists you in safely preparing for and executing your mission.

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MRAP OPERATIONS SAFETY CARD

- 1. Historically, about 40% of MRAP mishaps are ROLLOVERS, 30% PERSONAL INJURY, 17% TRAFFIC ACCIDENTS, 8% HITTING OBJECTS and 2% OVERHEAD HAZARDS. See countermeasures below.**
- 2. MRAP ROLLOVERS can be initiated by: maneuver, fall, or impact. Countermeasures are:**
 - Enforce use of crew restraints, wear of protective headgear, and security of all loads.
 - Practice rollover battle drills to standard.
 - Incorporate the potential for rollovers in risk assessments by evaluating the bridges and terrain along the route. Ensure hazards are briefed to include alternate or bypass routes.
 - Maintain situational awareness and exercise vehicle crew coordination.
 - Recognize that road shoulders overseas do not meet U.S. standards and may collapse under heavy vehicles. Dismount a ground guide as necessary. Remain clear of road edges and drop-offs. Do not cross unrated bridges without engineer guidance. Plan your routes after thorough terrain analysis.
 - Avoid abrupt steering maneuvers and practice proper control techniques if the vehicle leaves the roadway.
 - Reduce speeds while negotiating turns.
 - Avoid hitting medians or curbs.
 - Ensure Central Tire Inflation System is set to the terrain conditions you are operating in.

(See Panels 3 and 4 for additional information)
- 3. Common MRAP PERSONAL INJURY mishaps are: falling, crushing from doors, hatches, and Rhinos. Countermeasures are:**
 - Always use 3-points of contact when on top of the vehicle.
 - Use caution when operating doors, ramps, hood, and hatches. Keep hands, feet, and limbs clear.
 - Park the vehicle on level terrain whenever possible.
 - Use caution removing Rhino pin. Always use two persons to lower the Rhino.
 - Remove rings and jewelry when operating around MRAP vehicles to prevent finger degloving.

4. MRAP TRAFFIC ACCIDENTS. Countermeasures are:

- Avoid following too close. Maintain stand-off distance. Drive defensively and expect the unexpected.
- Emphasize crew coordination in alerting driver of traffic hazards.
- Drive at speeds appropriate to conditions and tactical situation.
- Be familiar with local national driving habits and rules of the road.
- Do not be overly aggressive. Do not rely on others to yield.
- Do not drive fatigued. Vehicle commander ensures driver is always alert.
- Know vehicle blind spots. Keep the windows and mirrors clean.

5. MRAP mishaps involving HITTING OBJECTS can be attributed to not operating the vehicle appropriate to terrain conditions. Countermeasures are:

- Always use ground guide(s) when backing the vehicle and have them positioned on the driver's side. Know your vehicle footprint.
- Operate the vehicle appropriate to terrain environment.
- Slow down in unfamiliar terrain.

6. MRAP OVERHEAD HAZARDS mishaps. Countermeasures are:

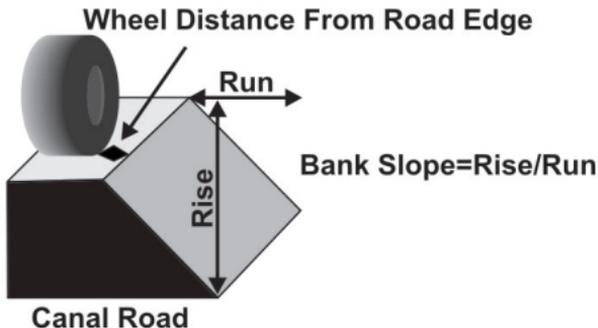
- Ensure gunner is especially alert of this hazard.
- Do not touch power lines.
- Look for unexpected low hanging power lines.
- Always ensure adequate clearance. Work as a team.
- Avoid radio transmissions while crossing under power lines.
- Know appropriate safe clearance from energized power lines (<50Kv = 10 feet, 51-200Kv = 15 feet, 201-300Kv = 20 feet) and vehicle height limitations. Electrical charge can pass to the vehicle without direct contact with power lines.
- More information on overhead hazard mitigation can be found in MRAP and M-ATV Vehicle Handbook No. 11-11, Feb 2011. To obtain a copy, submit your request at <http://call.army.mil>.

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7. MRAP Movement on Substandard Roads. The heavy weight of the MRAP can cause the road to collapse while traveling along canal roads or other paths bordering water.

Countermeasures are:

- As a general rule, maintain 5 feet from the edge.
- The closer the road surface is to the body of water, (less than 2 feet) the more dangerous.
- The steeper the slope of the road embankment, the more prone the road is to sheering and collapsing.



Road Safety Factor During Dry Conditions

Low Volume Road with Silty Sand Base and Sub-base Rut Depth = 0.7 inches; RCI = 275 Wet Soft Soil Strength Silty Sand (SM) Wheel Load, lb 10,000							Risk Level	
							Low Risk	
							Medium Risk	
							High Risk	
Bank Slope	Distance From Road Edge (ft)							
	0	1	2	3	4	5	6	7 ≥
Factor of Safety (FS) (Embankment Strength/Load)								
0-10%								Stay in the Green!
11-30%								
31-50%								
51-60%								
61-80%								
81-90%								
91-100%								
>100%								

Rating Cone Index (RCI)– An index of soil shear strength that takes into account soil strength loss from vehicular traffic. RCI is defined as the product of Cone Index (CI) and Remold Index (RI). CI – An index of soil shear strength obtained using a trafficability cone penetrometer. RI – ratio of soil shear strength before and after remolding. RI gives an indication of soil strength loss after many vehicle passes.

Road Safety Factor During Wet Conditions

Low Volume Road with Silty Sand Base and Sub-base								Risk Level	
Rut Depth = 4.0 inches; RCI = 90								Low Risk	
Wet Soft Soil Strength Silty Sand (SM)								Medium Risk	
Wheel Load, lb 10,000								High Risk	
Bank Slope	Distance From Road Edge (ft)								
	0	1	2	3	4	5	6	7	≥
Factor of Safety (FS) (Embankment Strength/Load)									
0-10%									Stay in the Green!
11-20%									
21-30%									
31-40%									
41-50%									
51-70%									
71-90%									
>90%									

MLC (military load classification): A standard system in which a route, bridge, or raft is assigned class number(s) representing the load it can carry. Vehicles are also assigned number(s) indicating the minimum class of route, bridge, or raft they are authorized to use.

MRAP Vehicle Dimensions and Weight

Vehicle ID		Gross Vehicle Weight Rating (lbs)	Height (in)	Width (in)	Length (in)	Military Load Classification	Turning Diameter (ft)
	M1240A1 MRAP ATV (OGPK)	37,000	131.4	122.4	248.0	18	62.2
	M1240A1 MRAP ATV (RWS)	37,000	138.6	122.4	248.0	18	62.2
	MaxxPro Dash MSU (OGPK)	48,500	143.0	138.5	254.3	27	54.9
	MaxxPro Dash MSU (RWS)	48,500	147.0	138.5	254.3	27	54.9
	MaxxPro Ambulance (OGPK)	53,000	152.0	138.5	270.0	32	67.5
	COUGAR CAT I 4X4 (OGPK)	44,600	132.0	107.4	255.5	22	69.2
	COUGAR CAT II 6X6 (OGPK)	57,600	137.5	107.3	292.5	28	92.9
	RG31 D07	44,000	141.4	97.8	276.8	25	54.1
	RG33L	52,000	137.0	113.0	414.0	33	80.2
	BUFFALO A2	66,000	156.2	105.1	341.7	37	70.0

MRAP Pre-Mission Checklist

1. DRIVER/VEHICLE PREPARATION	CHECK
Licensed to operate vehicle	
Dispatch complete	
“BEFORE” PMCS performed	
Technical Manual (-10) on hand	
BII/All present and serviceable	
First-aid kit	
Fire extinguisher; serviceable	
Load plan; equipment properly tied down/secured	
Vehicle topped off with fuel	
2X5-gallon can of water	
2X5-gallon can of fuel exterior-mounted dependent on mission analysis and unit SOP.	
Warning triangles	
MREs stowed/secured (2 cases for emergency only)	
Tools	
Area below seats clear of stowage	
2. COMMUNICATIONS EQUIPMENT	
Mounts locked and bolted down	
Radios (2)	
Headsets (4 minimum)	
Antennas: (2) tied down or as required by mission	
Simple Key Loader (secured to Soldier or assault pack)	
PMCS completed on all comms equipment	
Call sign /frequency board	
MEDEVAC w/9 line card (posted TC/DR/radios)	
UXO / IED report	
Short- and long-distance radio check	
Electronic countermeasures functional or as needed	
3. CREW-SERVED WEAPONS	
Clean and functional	
Spare barrels, cleaning kits on-hand	
Glove; ruptured casing extractor on hand (M2)	
Tripod w/T&E mechanism, bipod	
Head space and timing set (M2)	
Machine guns mounted	
Function check - test fire w/permission	

MRAP Pre-Mission Checklist (continued)

4. PROTECTIVE EQUIPMENT (PPE)	CHECK
Helmet	
IOTV w/IF	
Sun/wind/dust goggles/eye protection	
Hearing protection	
All occupants seatbelts fastened	
Gunners restraint serviceable and fastened	
Doors: combat locks secure	
5. VEHICLE COMMANDER	
PMCS performed:	
Vehicle	
Radios	
Ammunition basic load	
Maps, FBCB2/BFT	
Qualified gunner	
Vehicle load plan verified	
Equipment properly tied down/secured	
Compass/GPS present serviceable	
Convoy route and plan briefed	
Night Vision Devices, serviceable w/extra batteries as applicable	
Binoculars	
Driver/Assistant Driver licensed	
Driver properly rested:	
8 hours sleep in previous 24 hours	
Combat lifesaver w/aid bag/walk	
Current risk assessment	
Personnel manifest	
Rules of engagement briefed	
Patrol book w/ GTAs and battle drills	
6. ROLLOVER DRILL	
7. WATER EGRESS DRILL	
8. FIRE DRILL	