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# Hard Cab Design for HMMWV



## *Roscommon Equipment Center*

Northeast Forest Fire Supervisors  
*in Cooperation with*  
Michigan's Forest Fire Experiment Station



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### Acknowledgments

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AM General Corporation provided technical information useful in this report.

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### Disclaimer

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## INTRODUCTION

In 1990, REC designed a two door hard top cab for retrofitting U.S. Military M998/M1015 High Mobility Multipurpose Wheeled Vehicles (HMMWV). Like other military vehicles, most of these units are equipped with canvas tops. This report details a method for retrofitting canvas cab vehicles with a hard cab.

This cab design concept takes into account several things.

- The windshield frame and the "B" pillar are substantial aluminum structures that can be used to support a roof and a rear panel (see Figure 1).
- Because the support members are aluminum, special fasteners are needed to anchor the roof and rear panels.
- Fabricating hard panel doors is not practical. The design accommodates the unarmored hard doors utilized on several HMMWV models. These could be available through Excess or MILSTRIP sources.

REC also issued an evaluation report for the HMMWV and AM General's HUMMER® in 1993 (Report #56). That report contained an analysis of the vehicle and advice concerning loading capacity. It can be ordered from the address on the previous page.

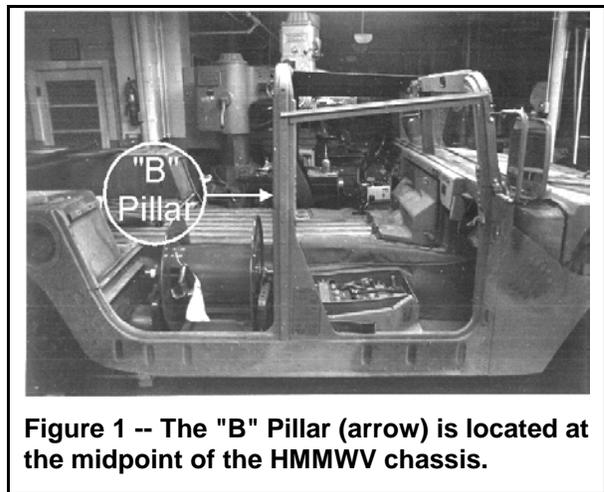


Figure 1 -- The "B" Pillar (arrow) is located at the midpoint of the HMMWV chassis.

## SOME PARTS LISTED MAY BE UNNECESSARY

At a later date, REC plans to publish its' 3-point suspended 300 gallon water tank. This tank is intended for the 10,300 lb. heavy variant HMMWV. The cab featured in this report is designed to work with the 300 gallon REC tank. If you are going to use

another tank such as a slip-on unit, some dimensional adjustments are needed. The drawing list indicates which drawings will be affected.

## GENERAL INFORMATION ABOUT THE TWO DOOR CAB

REC's cab design utilizes the windshield frame and the "B" pillar as the primary supports. The "B" pillar is the support found just rearward of the front seats. Two separate assemblies form the cab. The top of the cab spans between the windshield

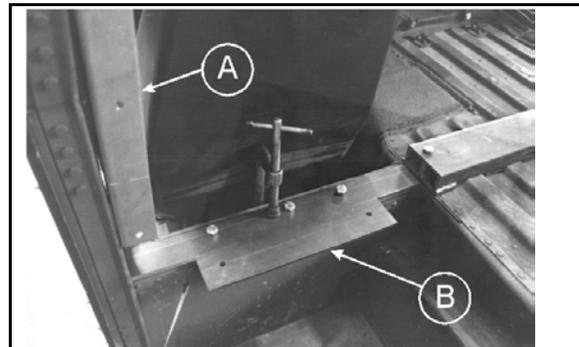


**Figure 2 -- The cab top mounting brackets were mounted to the windshield frame using two threaded insert nuts (33-0023). An isolator mount attached the roof to the cab top mounting bracket (35-0001).**

frame and "B" pillar. It is mounted with isolators to reduce stress from the vehicle's twisting movements (Figure 2).

The rear cab panel forms the back of the cab. At each side of the "B" pillar an angle is installed (part no. 35-0003). This becomes the attachment point for the rear panel (Figure 3).

A lightweight "H" rail (an AM General part) forms the upper door jamb on each side of canvas top vehicles. The sloped sides of the cab top are screwed to these "H" rails near the drip edge (see drawing 35-9801D and Figure 4). If the "H" rail is not available, a sturdy metal strip mounted from the windshield frame to the "B" pillar can be substituted. Locate the strip just above the bottom of the cab top's drip edge. Make sure it does not interfere with the door.



**Figure 3 – An angle (35-0003, shown as A) was fastened to the "B" pillar to hold the rear panel. A steel plate (24-0008, shown as B) was added behind the passenger and driver's seat prior to installation of the rear cab panel. This provided a place to anchor accessories in the rear.**

The rear panel is also attached at the top of the "B" pillar. Here "well nuts" are inserted into the aluminum "B" pillar. The top of the rear panel and attachment angle (00-0087)



**Figure 4 – Shows how the cab roof, rear panel and upper door jamb come together.**

are fastened to the "B" pillar by using the

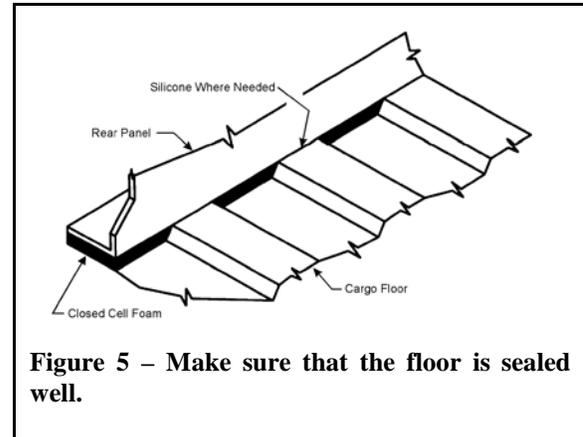
“well nuts.” The bottom of the rear panel attaches to the floor. Directions for sealing these panels are found on the assembly drawings. Closed cell weather stripping is used to seal between panel and the “B” pillar. The rear panel has a clearance opening for REC’s three point mount water tank. This opening is the inverted “T” shaped cut out at the center bottom of the rear panel. *This opening should be eliminated if you plan to use another style tank; e.g., a slip-on.* In this case, the panel should extend to the vehicle’s deck for its full length.

Sealing the rear panel to the rear deck can be tricky. The deck is corrugated for strength. That leaves a gap at every dip of the corrugation. We suggest filling these low points with pieces of closed cell insulation and using a liberal amount of silicone caulk along all points between the panel and deck (see Figure 5). If this is not sealed well, any water collected on the rear deck will find the way into the operator’s compartment.

Part number 24-0008 (see Figure 3), shown as item #12 on drawing 35-9800D, is an adapter plate for mounting accessory hardware in the rear of the HMMWV. There is one for each side of the vehicle.

## MILITARY HARD CABS

Some military HMMWV variants have hard cabs for combat roles. They are made from composite material, sloped like a fastback to the rear of the vehicle, and feature a gun



**Figure 5 – Make sure that the floor is sealed well.**

These can be eliminated if you wish, but remember to adjust the length of the rear panel to account for the 3/8” space filled by this part.

Laminated or tempered glass and mounting seal for the rear window can be obtained from most local auto glass installers. We added a 1/2” thick acoustical foam backed liner to both panels to trim out the cab. This helped reduce noise and made the interior more pleasant.

Drawing Number 35-9800D shows Part number 29-0038 (Item #21) mounted to it. This part is specific to the prototype unit and is not necessary.

## DOORS

Making doors to replace the canvas doors is not practical. Some hard cab models have a basic door made out a composite material, with windows. We purchased a pair from

turret mount on top. You might be able to modify one for a suitable cab. At this point we have not worked with this style cab.

AM General. The specifications and part numbers for these doors and necessary hardware are found on drawings 35-0005B and 35-0006B. These doors may be

available through Federal Excess Personal Property (FEPP), surplus sources or found through MILSTRIP. There are armored

door versions also. These are very heavy and best avoided.

### CONCLUSION

Making hard top cabs for military vehicles is often a difficult process. In the case of the HMMWV, the “B” pillar and windshield frame provide good support structures for attaching simple panels. However, you still need to obtain the doors, utilize some special fasteners and install a lot of weatherstripping. A cab built this way will provide the same amount of driver comfort as the military HMMWV. That means that tall drivers will be unhappy with the leg room. Like all military vehicles, there are tradeoffs for off road performance and occupant comfort.



Figure 6 – The prototype cab top shown in this project has endured seven years of field service without problems.

### DRAWING INDEX

<u>Drawing Number</u>	<u>Description</u>	<u>Comments</u>
35-9801D	Cab Assembly/Complete: Hummer	
35-9800D	Cab Sub-Assembly: Hummer	Item #21 is not necessary.
00-0529A	Spacer	1
00-0534A	Bar	1
00-0535A	Bar	1
00-0533B	Channel	1
00-0645A	Bar, Flat, 1/4" x 3/4"	
00-0646D	Rear Panel	2
00-0647B	Angle, Bottom Vertical LH	1
00-0648B	Angle, Bottom Vertical RH	1
00-0649B	Angle, Bottom Horizontal LH	1
00-0650B	Angle, Bottom Horizontal RH	1
00-0651B	Angle, Vertical LH	1
00-0652B	Angle, Vertical RH	1
00-0653B	Angle, Horizontal	1
00-0654B	Cab Top Stiffener	
00-0655C	Cab Top Mount	
00-0687C	Attachment Angle	

## Drawing Index Continued

<u>Drawing Number</u>	<u>Description</u>	<u>Comments</u>
00-0688B	Door Jam Gusset	
00-0701B	Gusset, Cab Top	
00-0702D	Front Support	
00-0703D	Cab Top: Hummer	
23-0039C	Front Tank Mount	1
24-0008B	Adapter, Mount	
28-1007B	Switch, Toggle SPST Off-On	3
28-2005B	Light, Auxiliary Work, 12 VDC	3
28-8002B	Dome Light Mount	
33-0023B	Nut Insert: 5/16"-18UN	3
33-0024B	Isolator Mount 75# NOM	3
33-0026B	Washer, Special 1.25" OD	3
33-0027B	Washer, Special 1.12" OD	3
33-0031B	Glass, Laminated 1/4"	3
33-0032B	Weatherstrip, Window Seal	3
33-0034B	Washer, Special 3.0" OD	1,3
33-0043B	Rubber Sponge Strip, Self Adhesive 1/2" x 1"	3
33-0035B	Blind Rivet: 3/16" Dia Large Flange	3
33-0036B	Blind Rivet: 1/4" Dia Regular Flange	3
33-0037B	Insulation, Acoustical Foam 1/2"	3
33-0038B	Rubber Sponge Strip, Self Adhesive 1/2" Sq	3
33-0040B	Rubber Sponge Sheet, 1" Thick	3
33-0041B	Sealant, Multi-Purpose Silicone	3
33-0042B	Construction Adhesive	3
35-0000B	Clamp	
35-0001B	Cab Top Mtg Bracket W/C	
35-0002D	Rear Panel W/C: Hummer	2
35-0003D	Mounting Angle	
35-0004C	Attachment Angle W/C	
35-0005B	Door Assembly Front LH	
35-0006B	Door Assembly Front RH	
35-0007D	Cab Top w/c: Hummer	

### Comment Notes

1. If you do not use REC's 3-point water tank, these parts are unnecessary.
2. If you do not use REC's 3-point water tank, this part will change slightly (see text).
3. This specification sheet for a hardware item, lists potential sources to help the user identify the item. Other sources may be available. Specification shows necessary details to obtain a suitable substitute.