

MA153 Project 1
Cougar H MRAP
Due: 10 October 2007

“I’ve never seen a weapons system have the impact that IEDs are having against us. Our conventional forces weren’t designed or trained or equipped to ever fight this kind of warfare”

~COL Kevin Lutz, CDR TF Troy, IED Task Force in Iraq

The unconventional mine warfare threat in Iraq has prompted congressional and military leaders to seek armored vehicles specifically designed to protect our Soldiers and Marines. These armored beasts, better known as Mine Resistant Ambush Protected (MRAP) vehicles, are nearly twice as safe as the M1114 up-armored HMMWV. MRAP vehicles combine a V-shaped hull and heavy armor to deflect mine blasts away from the crew compartment. Though military leaders in Iraq first requested MRAP vehicles in February 2005, only 700 are currently in theater and all are used for route-clearance and bomb-disposal. None have been used for routine combat patrols.

Several lawmakers have recently criticized the Pentagon’s efforts to field MRAP vehicles. In response, the Secretary of Defense has made MRAPs his top priority. He has assigned Mr. John Young to head a newly created MRAP Task Force to expedite the production and delivery of these life-saving vehicles. Mr. Young’s first task is to determine the expected number of MRAPs available each month for shipment to Iraq. Consequently, he has requested production forecasts from each firm vying for MRAP contracts.

You are an independent consultant recently hired by Force Protection, Inc., maker of the Cougar H MRAP. CEO Gordon McGilton, has asked you to draft the production forecast that will ultimately be forwarded to the MRAP Task Force. Specifically, he would like you to provide background information on Force Protection Inc., the Cougar H MRAP, as well as to provide an assessment of profits for production of 180 and 220 MRAPs per month. Additionally, Mr. McGilton would like you to present a recommendation for maximizing monthly profit, regardless of production rates. Accordingly, he had provided you information on the following page.

Cougar H Production Information

The Cougar H 4x4 is produced at Force Protection's Ladson, SC, production facility. This facility is capable of supporting seven production lines with up to 50 workers per line. Each worker costs the company \$9,000 per month (wages, pension, retirement, etc). Force Protection estimates each line can sustain a monthly production rate (in tens of MRAPs) according to the production function

$$P(w) = 0.11w^3 - 1.13w^2 + 3.8w,$$

where w is tens of workers on each production line. We expect a net profit of \$25,000 per vehicle.

The monthly facility operating costs at the Ladson, SC manufacturing facility is dependent on the number of operating production lines. Force Protection estimates the monthly cost to operate the facility (in hundred of dollars) by the cost function

$$C(l) = 1500 \ln\left(\frac{l}{8} + 1\right),$$

where l is the number of operating production lines.

