Civilian Armoured Vehicles (CAVs)
The Essence of Protection, Discretion and Mobility

Options for Fuel Tank Protection

From a common sense perspective, fuel tank protection on a civilian armoured vehicle is yet another major area of consideration when designing the vehicle system.

To start with, it is important to consider the fuel type used and its level of inflammability. Per se, diesel fuel is less flammable than petrol and so has a lesser tendency to be involved with fuel tank fires in armoured vehicles. Having said that, any fuel is flammable and should be enormously respected.

Historically, there have been two main ways to build in protection for the under vehicle fuel tanks on armoured vehicles.

The first is for the uparmouring company to weld armoured steel to the underside of the vehicle in such a way that it surrounds the fuel tank system. The fuel tank is then protected from projectiles that could either be kicked up from underneath the vehicle or enter (ballistic or fragmentation) from the side.

The benefit is that there is a solid metal surround that provides great protection. The downside is the significant additional weight and cost of the armoured steel and the potential for a build up of heat between the fuel tank and the armoured steel surround. This build up of heat, particularly in high temperature environments, can significantly affect the performance of the vehicle. Even if the armoured steel is only a plate and not a total surround, this build up is not that uncommon (one of my EU government clients had a vehicle consistently breaking down in the heat of Amman, Jordan and the primary cause was overheating of the fuel tank underneath the armoured steel plate)

The second way is to coat the fuel tank itself with a self-seal protective coating. The theory of this application is that while it would not stop the projectile from penetrating the fuel tank, it will allow it to pass through and then self seal the fuel tank so that it does not rupture and cause a significant leak.

The benefit is a reduced weight and cost associated with this application and this too can have a positive effect on the vehicle's mobility characteristics. The downside is that it does not prevent projectile penetration and there is a still a potential for a fuel fire caused by the friction of the projectile as it passes through the fuel reservoir (baffles inside the fuel tank can reduce this risk, although it does reduce the volume capacity of the fuel tank).

Personally, I prefer the self-seal tank method as the weight and cost savings, I believe, outweigh the overall risks of fuel tank vulnerability in most areas of operations. Of course, in very high threat environments, it may be that the projectile risks are so high, and in this case, the under vehicle armoured steel plates are likely to be a better option.

As always, it is a careful and considered balance of risk – likelihood and consequence – as against cost, mobility and weight considerations.

If I can assist you with any aspects of civilian armoured vehicles, please do not hesitate to contact me at **armouredconsulting.com**

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