



HOT-FORMING: A BRAND NEW SUIT OF VEHICLE ARMOUR

Today, somewhere in the world, people went to work and took a bullet. Or rather their vehicle did.

As part of a NATO convoy or border control operation, whether delivering aid, law enforcement or emergency services, or just carrying out a daily job in a high risk area, people put their faith – and lives – in their vehicle's ability to withstand ballistic and blast forces.

Surprisingly, perhaps shockingly, the armour worn by most vehicles sent to scenes of threat and conflict has remained virtually unchanged for a century.

The pioneering investigations of one UK company, partnered with technical precision of a German expert, has resulted in the development of vehicle armoury, and in particular a process called hot-forming, which now gives front-line staff the tools that are fit for twenty-first century purpose.

Jankel has built an international reputation in the armoured vehicle and personal protection industry, and, with hot-forming, has now delivered a breakthrough variation on the old maxim: less is more.

Strength in fewer numbers

Hot-forming basically replaces the 'jigsaw' of hundreds of welded components that traditionally form the shield of an armoured vehicle. Instead, fewer, larger, more resilient parts offer far more structural integrity and tensile strength.

The simple, natural protection afforded by an egg shell comes from one, single, complete component. With welded armour, the actual process of welding many pieces together naturally weakens the whole; the joints require reinforcement by further, heavier armour components. The shell has cracks.

On Jankel's new 200 Series Land Cruiser, hot-forming reduces the number of panels from 300 down to 36. A 70% reduction in parts compared to previous incarnations of the vehicle. Fewer weak areas exposed. Far more protection.

Jankel is believed to be the first company to hot-form the complete internal side of a vehicle including door apertures, overlaps and splash returns. One large component from firewall to rear cargo area offers a far stronger structure to withstand side and front-wheel blasts. That's one, big, tough shield to crack.

Singularly durable

Hardening by hot-forming (or stamping) and subsequent cooling allows steels to increase their strength from 500-800N/mm² to 1300-1700N/mm². Single-piece protective components can be molded to the shape required under relatively low pressure and with minimal residual part stress. The resulting grain flow and microstructure of the component is much superior to those that are joined by weld.

Larger, hot-formed components can more easily overlap to further eradicate the need for welding. Natural, unbroken curves in the vehicle armour, such as the B-Pillar and splash returns, increase structural rigidity in a blast.

Not only that, as there are fewer vehicle parts that require welding, bolts and other support, the overall weight is lighter – although the steel is thicker. And with fewer panels to potentially work loose through wear and the stresses of use, the burden of maintenance should be eased.

Of course, with specific regard to production of the vehicle, as hot-forming reduces the number of steel components, further potential benefits include lower manufacturing costs and faster production rates (for speedy delivery).

But hot-forming intriguingly opens up a variety of opportunities in many different sectors to create complex parts with tight tolerances.

Tested to (non) destruction

Scarred, hostile terrain is hardly the place to put new protective technology to the test, so Jankel sought a considered, clear-headed assessment of the capabilities of hot-formed armour.

Conforming to AEP-55 test protocols employed by an independent German test facility, recorded blast event forces show that vehicle occupants would be protected to a survivable level. Its live fire certification meets BRV 2009 and ERV 2010 standards.

Hot-forming is ready and proven to stand up to the rigors of a very difficult job.

Technical innovation always takes bravery and belief in ability, and in this case, a new idea is perfectly suited to the people who will benefit from it.

