ENHANCING VEHICLE SURVIVABILITY WITH ENGINEERED BLAST MATS

In conversation with

Taylor Hayley

SKYDEX Technologies, Inc.

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BIOGRAPHY

Taylor Hayley
Vice President of Sales and Strategy for the Defense Markets
SKYDEX Technologies, Inc.

Taylor Hayley is the Vice President of Sales and Strategy for the Defense Markets at SKYDEX Technologies, Inc. Mr. Hayley has been with SKYDEX since 2010 and leads the company's efforts in providing blast mitigation solutions for vehicle OEMs worldwide.

Having served in both Operation Iraqi Freedom and Operation Enduring Freedom, Mr. Hayley provides a unique hands-on approach to every SKYDEX development. While serving, Mr. Hayley was awarded the Bronze Star Medal for his leadership in the field and was honorably discharged.

SKYDEX Technologies, Inc. engineers high-performance, impact and cushioning solutions using their patented energy absorbing (EA) technologies. SKYDEX products have been used to increase the armed forces' operational performance and improve troop survivability in military vehicles since 2008. With almost 17 years of developing and manufacturing EA materials, including some of the original blast mat solutions, SKYDEX offers strong depth of data and experience. From blast mitigating decking installed in over 24,000 military vehicles worldwide to blast seat cushion inserts to enhance seat performance, SKYDEX engineers its proprietary, geometry-based technologies to meet specific requirements that maximize both product and end-user performance.

INTERVIEW

"In the case of Afghanistan, increasing the survivability with more armour resulted in vehicles that lost mobility, which in turn decreased overall survivability"

Q1. Can you provide us with an overview of the survivability and mobile protection challenges or limitations affecting the armed forces today?

Threats from the enemy continue to evolve which tends to require larger and heavier vehicles. However, the forces in the field need lighter, smaller, and more agile vehicles to enhance combat effectiveness. This creates a challenge when countering battlefield threats, especially IEDs and underbelly mines. Less weight means more effects from the threat are experienced by the occupant which directly relates to blast event survivability and troop effectiveness after an event.

Additionally, as the Government has had the time to reflect on injuries and look at the broader scope of what we've experienced in the past decade, we know there is a need to enhance the current standards for armoured vehicles. Future solutions need to reduce muscular and skeletal injuries and improve comfort for crew and dismounts to extend mission endurance.

Q2. How have experiences in Iraq and Afghanistan shaped platform design considerations for the next generation of armoured vehicles? As we shift towards a 'high end' warfighting concept, how might that inform decision-making around future vehicles programmes and requirements?

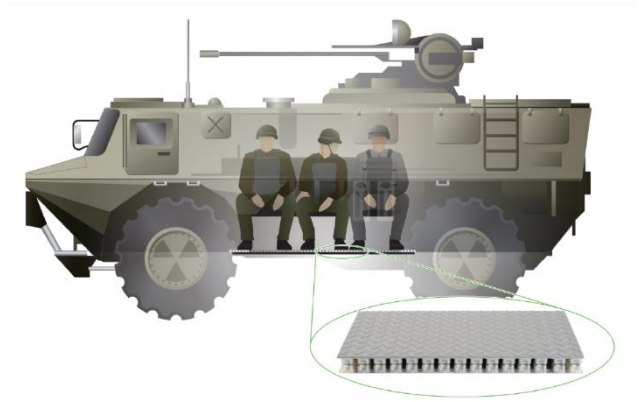
The first wheeled vehicles in Iraq and Afghanistan did not have sufficient armour or hull protection. When they encountered IEDs, the injuries sustained were quite high, resulting in significant degradation to combat effectiveness. This was compounded with the morale effect of such casualties. While the MRAP style vehicle was designed to combat IEDs, once these were introduced, the injuries started to change. Instead of penetration wounds from shrapnel and hull breaches, service members started to experience lower limb injuries. Quite frankly, industry did not understand the amount of energy that was transferred through the vehicle to the occupant. In the case of Afghanistan, increasing the survivability with more armour resulted in vehicles that lost mobility, which in turn decreased overall survivability.

We now have a more complete understanding of the relationship between lower limb injuries and design factors that specifically protect against underbody blasts. What was once an afterthought is now a core factor in designing for survivability.

Q3. There is a big focus within the Defence community right now on innovation. Can you share some insight into Skydex's innovation process – from user-focused engagement, through to prototyping and manufacturing?

At SKYDEX, we start by listening to the customer and the market. This is one thing that sets us apart from other solutions, we truly understand the event that our customer is trying to protect against. We also, based on employee experience, have a deep understanding of how the vehicles are used, which is a key factor in our approach to innovation. SKYDEX takes great pride in our in-house design, test, and manufacturing teams. This allows us to produce everything from COTS items, tried and proven in the field, to bespoke solutions for our customer's unique needs. Having this all under one roof allows us to quickly move through the innovation and development process.

By leveraging our industry-leading technology and market expertise, we are a full-service engineering and manufacturing company that provides our partners with holistic solutions born from cooperative design, driven by scale-based manufacturing and engineered for simple vehicle integration.

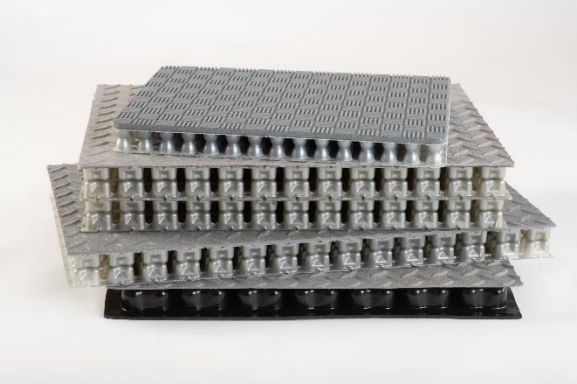


Energy-absorbing panels featuring SKYDEX technology have been specifically engineered to reduce tibia loads during underbody blast events, reducing the chances of lower limb injury and increasing blast event survivability

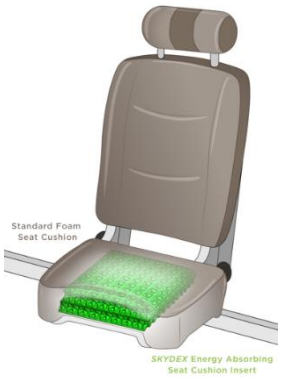
Q4. Speaking of innovation, could you bring our readers up to speed on some of the most exciting products you're developing?

Our team is focused on continually pushing the limits with lower leg protection. As vehicles become lighter, the forces on the floor become greater. In response, we have focused on developing solutions that combat a higher range of threat levels. We have also integrated this same technology into blast seat cushions to provide a unique approach to blast protection in seating. Ultimately, this reduces overall cost, weight, space, and complexity when compared to legacy systems. When we look to the future, autonomous systems on the battlefield start to become a reality and the traditional thought of survivability begins to change. Perhaps a sensor becomes the critical element that must survive a mine blast or IED when shock and vibration can render these sensors inoperable. Our technology can help address and solve these challenges.

Additionally, during the shutdown of COVID, our R&D team has had the opportunity to focus on the sustainability of our products and identifying materials that excel in the vehicle environment. We are excited to see how these innovations shift our future development.



SKYDEX offers a range of COTS products that protect against low, medium, and high threat levels.



SKYDEX has developed seat cushion inserts that are layered within traditional foam cushion materials to enhance protection capabilities

Q5. It's great that you'll be participating as one of our industry partners at the 2021 International Armoured Vehicles conference - what are you looking forward to most?

Our success is rooted in listening to the challenges that industry is facing and identifying ways to leverage our core capabilities to solve problems. With everything being shut down over the past months, we have had the opportunity to look at our solutions differently and are excited to bring these new tools to the table to overcome future obstacles. Our team of industry experts are at full capacity and look forward to connecting with everyone in the coming months and at the event in 2021.

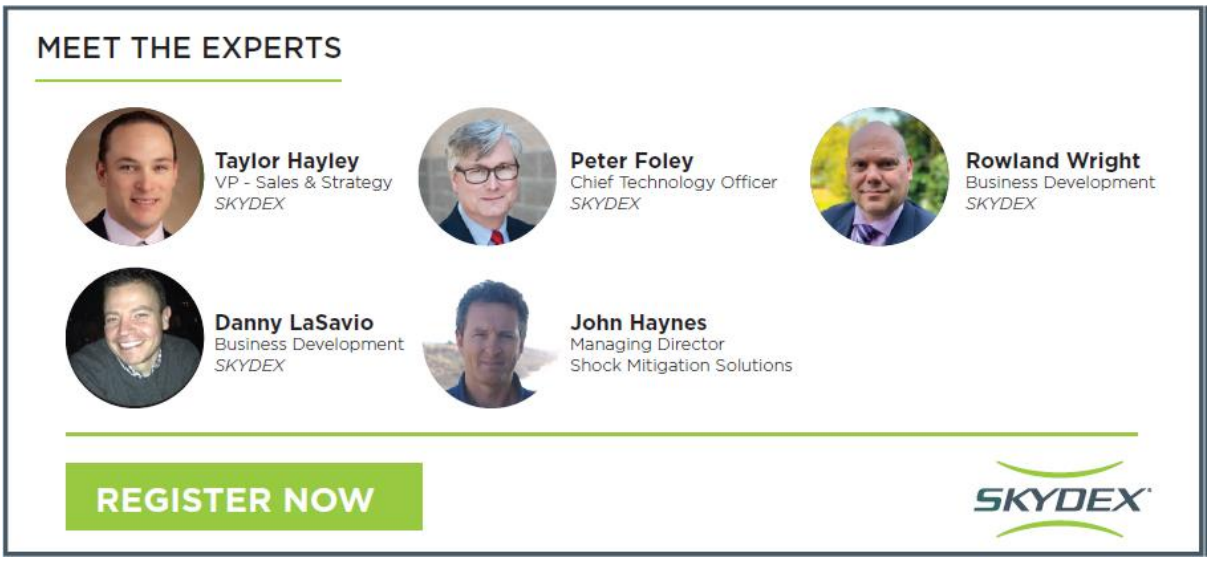
FREE WEBINAR: ENHANCING VEHICLE SURVIVABILITY WITH ENGINEERED BLAST MATS

7 OCTOBER 2020
1400 BST | 1500 CET | 0900 EST

Underbelly blast events have been the most persistent threat facing the armoured vehicle community for 15+ years. Vehicle manufacturers strive to provide protective solutions that both increase survivability and ensure soldier operational readiness and battlefield e-ectiveness.

Working with vehicle manufacturers and end-users worldwide, SKYDEX has been successfully engineering blast mat materials that are proven to enhance a vehicle's protective capability. Our expert speakers will present performance data, industry trends, and design solutions that explore what vehicle manufacturers and government organizations are doing to protect vehicle occupants by answering these key questions:

» How do human factors a-ect vehicle design for blast protection?
» What performance attributes lead to successful material selection?
» How does the vehicle environment limit potential product design?
» What can be learned from successful solutions in adjacent markets?



A live Q&A session will follow the presentation

https://www.defenceiq.com/army-land-forces/webinars/enhancing-vehicle-survivability-with-engineered-blast-mats

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Please get in touch with the Editor, Alex Stephenson, at alexander.stephenson@defenceiq.com to discuss submission proposals.