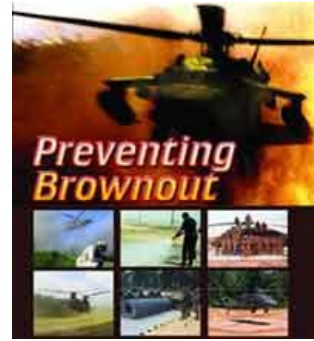


Expeditionary ramps and taxiways can become virtually unusable without preparation. With products ranging from chemicals to steel to plastics, industry is delivering solutions to operate in environmentally challenging locations, especially for helicopter operations.

By J. Michael Brower



The main photo above illustrates the dangers and problems caused by helicopter rotorwash as this UH-60 Black Hawk kicks up a cloud of dust while landing.

Living with brownouts is an everyday occurrence for deployed units, and several companies are rising to the challenge of reducing the risks as shown to the left (in clockwise order, starting upper left): An HH-60G Pave Hawk blows dirt and debris during a training exercise near the Baghdad airport; Mobi-Mat matting has had success, shown here deployed with the 101st Airborne in Iraq;

Expeditionary ramps and taxi-ways can become virtually unusable without preparation.

With about three of every four helicopter accidents in Iraq and Afghanistan caused by brownouts, coalition forces are struggling for plausible responses. Brownouts are caused by excessive dust and dirt thrown up by aircraft taking off, landing or, often in the case of helicopters, just idling. They turn piloting from a challenge to a nightmare in minutes, both blinding operators and sending debilitating sand into sensitive engine and mechanical compartments. Black Hawks and Chinooks are experiencing most of the problems with these frequently self-inflicted sandstorms.

Conversely, sometimes the slightest amount of moisture can turn an otherwise hard packed ramp into a sea of mud choking any possibility of even vertical air operations.

Desert operations for the 101st Airborne Division (Air Assault) (AASLT), created a unique requirement for temporary helipads to be used as forward operating bases (FOB). Dust and foreign object debris (FOD) drastically shorten the lifespan of helicopter rotor blades and engines when a control measure to reduce the effects of the rotor wash goes unused. There are several commercial solutions available, which intend to cover up the dust (and in some cases, snow and mud) and, alternatively, hold it chemically together.

Please, Get Snooty

An innovative and patented matting, Mobi-Mat, from the U.S. company DMS Inc., has made a real contribution in the brownout mitigation arena. This solution, which consists of 14 foot wide by 34 foot rolls, acts as a giant carpet, making a life-saving

virtue of "sweeping the dirt under the rug." Mobi-Mat is essentially a high quality polyester mesh that allows air to pass through it. This type of mat has the ability to be manually installed, removed and repositioned rapidly with wind direction changes and as the front moves forward.

Gaëlle Stuit, president of DMS, commented that special operations forces need to minimize their logistical footprint and optimize the transportability of critical equipment, to have special ops capable teams as small and agile as possible. "You don't need 'material handling equipment' to put this mat down," explained Stuit. "Also, it is night vision goggle compatible, helping pilots to find the landing site in night operations."

"In the past, tremendous expense and logistical challenges were incurred replacing both helicopter main rotor blades and engines due to dust and FOD kicked up by the rotor-wash of helicopters landing and take-off," observed Stuit. "Mobi-Mattings are rugged and durable, require no special training, nor maintenance, will not be sensitive to climate changes and can be used anytime, in any type of environment and on any type of terrain, preventing whiteouts and brownouts thus improving safety while decreasing overall maintenance cost. As it has not been developed for a particular platform, Mobi-Mat can be used for any kind of rotary aircraft currently fielded in the Army, the U.S. Marine Corps and special operations forces, making it a true joint asset," according to Stuit.

In November 2001, Mobi-Mat was tested and selected as the lightweight/medium duty matting for rotary-wing aircraft by the Naval Air Warfare Center, Expeditionary Airfield Team (EAF) in Lakehurst, NJ, and later won a comparative testing carried out by the 326th Engineer Battalion from the 101st Airborne Division (Air Assault)(AASLT) at Fort Campbell, KY, in April 2002. Further testing carried out in September 2002 at Cherry Point MCAS and 29 Palms, CA, in a desert environment demonstrated the capabilities of Mobi-Mat in harsh environments and resulted in NAVAIR and Marine air wings units placing large orders of Mobi-Mat Helipad.

As Mike Jiavaras, EAF team lead, said "Our airfields follow the Marines. We needed to go out and find a lightweight airfield just for rotary wing aircraft."

According to AASLT, procurement of the Mobi-Mat (...) system was needed to fill the gap in capabilities left by the exhaustion of the M19 and AM2 system stocks. A special operations memo noted that these systems were found to have "superior capabilities." The 101st and the 159th have extensively used the Mobi-Mat during major OIF combat operations, as Colonel Palumbo, commander of the 12th Aviation Brigade, said, "I personally landed on your matting many times in the middle of the desert and they performed magnificently."

Business is "Booming"

The military's need for forward Army refueling points, MEDEVAC landing areas and logistical ramp areas for rolling off heavy equipment from C-130s, C-5s and C-17s demand improved ramping, chemically reinforced ground and matting systems. Whether it's a mat system or a chemical soil treatment system, they must be environmentally friendly.

Currently, aluminum panels (e.g., the AM2 mat) are still in wide usage but, principally due to weight and availability issues, are being seriously challenged by the polymer and matting providers. With the Marine Corps and 101st Airborne Division continuing to increase procurement of small, lightweight, commercial off the shelf (COTS) expeditionary products, mat systems been used to support rotary aircraft to include the CH-46, CH-53, AH-1, UH-1 and AH-64.

With no end in sight to the need to transport and utilize matting systems in desert and other harsh environs for helicopter landing use, the military will continue to need such systems, according to USSOCOM, to be: lightweight and easily transported by C-130, C-17 and CH-47; durable enough to sustain thousands of direct helicopter loads; reusable; easy to install without special tools; require little training; environmentally friendly; NVG-compatible; and low in cost.

According to AASLT, procurement of the Mobi-Mat (...) was needed to fill the gap in capabilities left by the exhaustion of the M19 and AM2 system stocks. A special operations memo noted that these systems were found to have "superior capabilities." With the 101st's inability to pave, landing solutions that are versatile and durable are in high demand.

Hello Helo Hell

In 1991, during Operation Desert Storm, the AASLT was afflicted by FOD damage caused by helicopter rotor-wash during landing and take-off in the austere desert environment. The 326th Engineer Battalion researched and tested a non-permanent landing platform to reduce the effects of FOD and dust on helicopters.

But with stocks of traditional Army matting material depleted (M19 and AM2), sprays and matting solutions became highly attractive. Reduced ability to transport M19 and AM2 due to high OPTEMPO and the reduced availability of MHE and the unwieldy nature of traditional plating systems to cover up the desert terrain, called out for new private sector solutions.

(...)

Helicopter pilots today certainly know what they want to reduce the dangers of brownouts. Major Brian L. Thompson, deputy director of Systems Integration for Special Operations Aviation, 160th Special Operations Aviation Regiment (Airborne) (SOAR), recommended getting feedback from the pilots themselves.

Chief Warrant Officer 5 Jeff Elmore, a MH-47 pilot from the 160th SOAR, understands the difficulties encountered by today's rotary and fixed wing fliers. "We need to develop a spray or membrane to disperse over the area that will withstand the rotorwash of an MH-47 to reduce brownouts during landing and taxi operations. They need to make it biodegradable so there is no need to recover the device or membrane when the unit departs the area."

Reduction of sand ingestion into engine systems ranks right up there with inability to see through brownouts. As Elmore said, "Any technology available to decrease the effects of dust and particulates on aviation equipment to include engines, main and

tail rotor blades, avionics components, is needed.”

Similarly, Chief Warrant Officer 4 Ben Savage, a MH-60 pilot also with SOAR, recommended that ramp systems need to be lightweight, easily transported, readily configurable, and shouldn't interfere with refueling activities. "Ramps have to be able to withstand exposure to fuel, oils, solvents, water and sand and be compatible with both skids and wheels. They also have to allow for relocation of skid aircraft using ground wheels, support a lighting system and low cost," Savage observed. For the pilot, simplicity of design, functionality and a good value are the ramp features of choice.

Savage also commented that ramping systems have to be compatible with quick landings and departures, since taking off and landing, "can be the riskiest part of a mission. We are currently past the capability of tactics solving the brownout/rough terrain issue. We have pushed fielded technology to the limits, and now tactical capability is being affected. A material solution is required."

Another worry for pilots is night brownouts, as is the ability of anything applied to the desert landing area to withstand repeated 50,000-pound aircraft impacts. Savage expressed the need for flight controls with better handling qualities (fly-by-wire), more power available to the pilots (growth engine), lightweight obstacle detection systems, high resolution ground mapping for a low recon, better night vision systems, fused sensors, and better simulation to train aviators and crewmembers. Ramp preparation and brownout prevention are what pilots are hoping contractors can solve, and the sooner this is done, the fewer lost aircraft.

From Brown to Clear

The cost of replacing engines and rotor blades, plus the danger to personnel, by failing to deal with brownouts is not acceptable to the U.S. military, hence the tremendous interest in augmenting traditional landing plates and offloading ramps with innovative private sector COTS solutions. It would appear that DoD's private sector partners are willing to step up to the plate.