GEOTERRA® Helipads

The Eco-Environmental Solution for Expedient Construction of Helicopter Landing Pads

Article by Daniel Senf, PE, CPESC and Patricia Stelter, Presto Geosystems

Environmental and Other Challenges

As oil exploration efforts expand around the world, balancing the need to access land while adhering to environmental regulations and maintaining a minimal footprint can be a challenge. Access and transportation of materials into oil, gas, and mineral exploration sites create logistical challenges that significantly impact overall project costs. This is especially true in remote sites, where transportation of materials is most commonly done via helicopter. The requirements and costs associated with transportation of the helipad materials are many times the single greatest cost item in developing the site. Therefore, the number of trips the helicopter must make to deliver all materials and labor crew into the site is directly related to the weight of the helipad materials. One trip with all materials and the installation crew is most cost-effective.

In addition, environmental regulations may restrict or limit materials deemed suitable for use in certain environments, climates or geographical areas. In many areas, helipads are developed in environmentally-sensitive or protected areas where minimal negative environmental impact is required.

Materials that are brought in must be completely removable when the site is closed and may also need to meet other requirements: 1) must be chemical and weather-resistant, and able to withstand the effects of harsh climatic conditions (i.e. tropical, arid, arctic, high elevation), 2) be effective with varying and often unstable soils, 3) be removable and reusable (if required) and 4) require minimum maintenance.

The GeoTerra Mat Solution

A proven system for constructing helipads that complies with all of the above requirements has been successfully employed for not only constructing helipads, but also for oil drilling platforms, construction access roads and equipment storage. The Presto GeoTerra® system is a highly cost-effective structural mat structure that exhibits the following characteristics:

The helipad system is assembled using 0.5 m x 1.0 m individual GeoTerra units that are typically pre-assembled into larger mats either on or off site, flown into the site and assembled to the dimension of the landing area.

Exceptional material performance and adaptability: The GeoTerra system is manufactured from high strength, durable polyethylene resistant to industrial chemicals and inert to natural elements. The structural units are designed to support loads over very poor soil surfaces and can be assembled to meet all project size requirements. The system's PadLoc™ connection device allows for assembly of the units to the required mat size, and disconnection of the mats for removal and reuse.

Low material weight and delivery costs: GeoTerra units are light-weight and can be preassembled into larger mats off-site and transported to the installation site with minimal cost.

Ease of installation, removal and recovery: Once on site, the mat system can be installed quickly using any available unskilled labor with minimal training. Once no longer needed, the system can be quickly disassembled and readied for extraction from the site, reused on the same site or stored and used on future sites**.**

The GeoTerra system weighs approximately 9 kg per square meter. A helipad this size can easily be transported in two preassembled sections.

Environmentally-friendly: The GeoTerra system can structurally stabilize surface soils making development of vegetated surfaces possible as it does not impede surface drainage.

Impact-absorbing surface: The GeoTerra system's non-rigid surface absorbs dampening energy during touchdown. The impact-absorbing surface results in less stress accumulation for the mechanical and structural components of the helicopter as well as lower impact to the personnel within the helicopter.

Typical landing / takeoff areas for personnel may be as small as 5 m x 5 m but will always be dependent on the size of the helicopter.

Safe surface prevents debris movement: A helipad system which reduces or prevents particles from becoming airborne is essential. Airborne particles can be dangerous to ground personnel near the site during landing and takeoff of the helicopter as well as harmful to the engines of the helicopter when drawn into the air-intake of the helicopter. Also of concern is the potential visibility reduction created by swirling materials upon takeoff and landing. The GeoTerra system completely separates the underlying soils over which it is installed from the surface thereby preventing movement of typical surface debris associated with non-stabilized surfaces.

For areas where larger equipment and materials are dropped, a 20 m x 20 m area may be more typical. The material for this size helipad could be transported in 32 sub-assemblies and easily assembled by a two person crew in three days.

Used on several remote Amazon Basin oil exploration and production sites, the GeoTerra structural mat system was ideal for the harsh environment and proved successful in creating low-impact, low-cost, and highly-effective helipads that met all of the environmental and logistical criteria.

Weighing Options

Often materials located nearby to the site are not suitable for construction due to poor stability characteristics and often they are not suitable for ballast at high downwind conditions. Alternative options were evaluated and considered too costly or inappropriate for use.

- **Asphalt and concrete**

  Asphalt and concrete were not acceptable for these remote sites due to very high helicopter transportation cost of raw materials and equipment needed to install those materials. Concrete and asphalt slabs are also extremely difficult to recover once the site is abandoned, resulting in a negative environmental impact.

- **Timber**

  Timber was not considered primarily because of the negative environmental impact associated with its use. Most often, the timber planks are obtained from cutting of old trees near the site. If additional planks are required, their significant weight makes them costly to fly into locations and costly to assemble into a helipad. In tropical climates, timber also has a very short useful life due to rapid environmental deterioration.

- **Turf**

  Turf was unacceptable due to climatic conditions and soil types. Turf development-time precluded its choice. However, if turf is highly desired, consideration should be given to the GeoTerra system which provides excellent ground-surface reinforcement during turf development.

- **Composites and Aluminum**

  Composites and aluminum are lightweight, easily transportable using small equipment, lend themselves to removal and recovery, are weather resistant, and virtually maintenance proof, but they are also quite expensive in comparison to the GeoTerra system. In addition, aluminum and composites often have no-to-low dampening characteristics during touch down of the helicopter, causing stress to the helicopter and personnel.

When the total cost of ownership, including materials, transportation, installation, maintenance and recovery, is considered, the GeoTerra system is very cost effective when compared to other helipad materials.