

Fighting Fire with Fire

The valuable role of aerial ignition devices.

For more than 100 years, the wooded landscape has experienced significant transformation. Some of this change has been a result of climate and natural causes such as forest fires but much of the impact has been imposed by the development of modern civilization. Part of this world-wide influence has been a result of wildland fire suppression activities. Through the diligent work of fire suppression crews, initial attack fires have been contained to relatively small areas saving people, property and vital natural resources.

However, as any wildland firefighter will tell you, the forest fires of today are burning hotter, spreading quicker and eventually burn more area than ever before. It's an alarming situation given that these fires can quickly escalate to become far more dangerous and more damaging in terms of human, economic and ecological costs than they were in the past.

So what's happened over the past century to create this new woodland worry? Simply put, excluding fire from its natural and positive role in forest eco-systems has produced overburdened landscapes filled with dead, tinder-dry vegetation; dense stands of trees and tree species have evolved, over time, to be less resistant to fire. In addition, global warming has exacerbated the spread of forest pests, for example, the mountain pine beetle that has infiltrated vast tracks of forest land in western Canada and USA.

Past land-use practices have also helped to create a forest floor that, in some areas, is 'fuel-loaded' to the extreme. Under these conditions, it only takes one lightning strike or careless camper in the wilderness to ignite an unstoppable inferno.

Complicating an already volatile situation is the latest trend of building homes and vacation properties deeper into the wildland areas. Today, with more disposable income available and soaring prices in already-established resort areas, many homeowners have opted for a lakeside cabin in a remote but more affordable location. The result is that both new, expensive homes and remote cabins are being built in areas where the nearest municipal or volunteer fire department may be hundreds of miles away. This lack of access to fire protection often prevents the property owners from qualifying for insurance coverage, leaving the onus of fire protection on the homeowner themselves or on limited government resources that might be tasked with other forest fire suppression priorities.

Of course, for anyone working in wildland fire control, none of this is news but, for many naive homeowners, a near-miss with a raging wildfire can be an unsettling wake-up call, especially when they suddenly realize they've built their dream home or vacation property in an area that is prone to cyclic burning – in a fire regime. Modern fire management is now taking a hard look at what options are available to reduce forest fuel-loading.





Prescribed burning has always been considered one of the best tools in the arsenal because, by introducing fire in a controlled manner, land managers are able to restore the natural balance without having to wait for an uncontrollable fire storm and the ensuing destructive blaze to do it for them.

In prescribed burning, a carefully controlled burn can reduce the build-up of dead debris, curb insect, disease infestations, improve wildlife habitat and release important nutrients back into the forest floor.

A prescribed burn can be planned for using available science and enabling technologies, with well managed 'burn plans' to ensure that only the designated area burns and not anything outside that area.

However, due to public outcry over the smoke and resulting impacts that poor air quality can have on health of local citizens and the tourism industry, some organizations have been forced to postpone their scheduled burns year after year.

Alternatively, controlled fire can be used as a fire suppression tactic to prevent fire from spreading by essentially removing the fuel in advance of large fires by burning off the vegetation in its path – a strategy known as 'backfiring' or 'back-burning.' Clearly, balancing the use of controlled fire with fire suppression activities is a delicate juggling act but one in which there is much to gain.

The advent of aerial ignition devices

Over the years, a number of methods have been used to ignite controlled burns including drip torches, terra torches, heli-torches and aerial ignition devices (AIDs). These same devices have also been used during active fire suppression action to initiate a back burn or to burn off unburned fuel areas within a fire perimeter that have potential to flare up at any given moment and emit fire brands that could challenge established fire breaks and cause spot fires outside of the fire area.

Early AIDs were usually comprised of polystyrene tubes or balls filled with the chemical potassium permanganate and then manually injected with ethylene glycol. The time-delayed exothermic reaction created by the two chemicals resulted in spot fires wherever the balls landed. Needless to say, injecting the balls and then dropping them by hand was slow and labor-intensive.

Later, a mechanical system of dropping incendiary devices, using a fixed-wing aircraft flying a grid pattern, was developed in Australia in 1966. During these early tests, the Australian AID system enabled 85,000 ha of forest to be ignited in 18 days with very successful results.

Over time, the AID system has evolved into a more sophisticated and effective device called the plastic sphere dispenser (PSD). Typically, a PSD is mounted into a helicopter with the dispenser doing most of the work of injecting and then ejecting the charged spheres through a drop chute leading out of the aircraft. Once injected, the chemicals inside the spheres react and ignite in 25-30 seconds.

The teaming of the Red Dragon dispenser with Dragon Eggs has resulted in a next generation aerial ignition system that offers more safety, features and operability than any other PSD available today.

Manufactured by SEI Industries, the same company that invented the world-renowned Bambi Bucket®, the Red Dragon dispenser provides a number of distinct advantages over existing models including:



- Seven different drop rates (producing a range of 25 – 175 spheres per minute) that can be easily selected by the click of a dial. Existing models only offered four speeds and were prone to jamming when changing speeds.
- Micro-processor controlled motor and feed gates virtually eliminate sphere jamming and provide automatic jam detection and clearing. For anyone who has used an older PSD, this feature couldn't have come soon enough.
- Fixed-displacement pumps that deliver the same amount of glycol, no matter what speed is selected, compared to the old method of some spheres getting too much or too little glycol depending on the motor speed.
- A safety system that utilizes a back-up battery to ensure on-board fire suppression response capability in the event of a main power failure.

Additional convenience features include a re-settable sphere counter, a larger capacity hopper, tank drain valves, a user-friendly tethered remote control and a removable base to provide easy installation in various helicopter configurations. Dragon Eggs also have a number of distinct advantages which include ignition reliability (no duds), multi-colored spheres to increase visibility and smaller sphere size. This smaller size still delivers the same amount of active ingredient as previous spheres but allows twice as many spheres for the same volume.

In 2006, after four years of extensive research, development and comprehensive field testing, the latest generation of aerial ignition systems was introduced with the unveiling of the Red Dragon PSD and its corresponding Dragon Eggs. In December 2007, the Red Dragon dispenser and Dragon Eggs received an official letter of approval by the US Forest Service, US Fish and Wildlife Service, Bureau of Indian Affairs, National Park Service, and Bureau of Land Management.

As an aerial ignition system, the Red Dragon PSD and Dragon Eggs, with its safety features, ease of use, superior performance and value-added operability make it the ideal fire tool to increase burn effectiveness and decrease associated helicopter operating costs.



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