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THE RANGE IS HOT

What You Need to Know About Outdoor and Indoor Ranges When Planning One

By Richard MacLean

OUTDOOR RANGES

A safe place to shoot is essential for anyone who owns or uses firearms. For the military, law enforcement and security professionals their livelihood, if not their life, depends on live fire training. Hunters must sight in their guns and where better to do this than at a local 100-yard outdoor range. Even collectors who rarely fire their valuable weapons may feel the need to test fire a treasured favorite.

In the not-too-distant past, outdoor places to shoot were abundant and had few constraints. Today, with urban sprawl and encroachment, restrictive local laws, and, shamefully, the few target shooters who trash good sites, informal ranges are becoming an endangered species and permits for sanctioned ranges are more and more tightly controlled. A place to shoot is becoming a hot commodity, more so than most gun enthusiasts may realize.

Historically, the gun press has been focused on protecting Second Amendment rights, specifically gun bans, self-defense and concealed carry methods and laws, and ammunition and magazine restrictions. And



Do not allow your favorite shooting spot on public land to look like this photo taken by the U.S. Forest Service in 2017 of the Doce Pit area in Prescott National Forest. Fortunately, volunteers have cleaned this area up and it remains open. (Photo courtesy US Forest Service)

so it should. This article, however, focuses on a dimension to our gun rights seldom considered, namely long-term access to shooting ranges. Shooters may grumble over range fees, but once you know the facts, you will realize the advantages they offer at bargain prices. It is very expensive to build, own and operate indoor and outdoor ranges. We must all do our part to take care of and support local ranges and informal shooting sites, lest they too become as threatened as our Second Amendment rights.

Public Land — Use It Responsibly or Lose It

Informal, recreational shooting, especially out west, is typically done on government-controlled lands such as the US Forest Service (USFS), National Park Service (NPS), Bureau of Land Management (BLM), Fish and Wildlife Service (FWS), and state park and recreational areas. Federal and state governments control about 35% of the US land area, from a low of 0.9% in Kansas to a high of 89% in Alaska. One might correctly assume that it would be easy to find a spot to shoot in Alaska, but what about Kansas? If private land is within your reach, Kansas is ideal. Shooting in congested areas such as Connecticut is problematic because of local restrictions. For example, rifle hunting is only permitted on private land of at least 10 acres.

The bottom line is that having easy access to informal shooting sites can be difficult if you do not have permission to shoot on private property or if you live in congested areas. With urban sprawl, it has become a trek to drive to unrestricted areas, even for the seemingly remote expanses surrounding major cities such as Phoenix and Las Vegas. Shooting sites are precious, but unfortunately, a very few irresponsible shooters



Real bullets do not spark and explode gas tanks like in the movies. One of the few places in the world that you can safely observe ricochets is the tracer and incendiary night shoot at the Big Sandy in Arizona. (Photo courtesy Rob Lippert)

continue to trash them. State and federal agencies are not unaware of trashed sites on government-controlled property (see the accompanying photograph taken by the US Forest Service). The net result is the risk of permanent closures in the form of steel barriers or large boulders blocking access roads. Fortunately, local gun clubs are stepping up and organizing periodic volunteer site cleanups.

Public and Private Land — Safety First

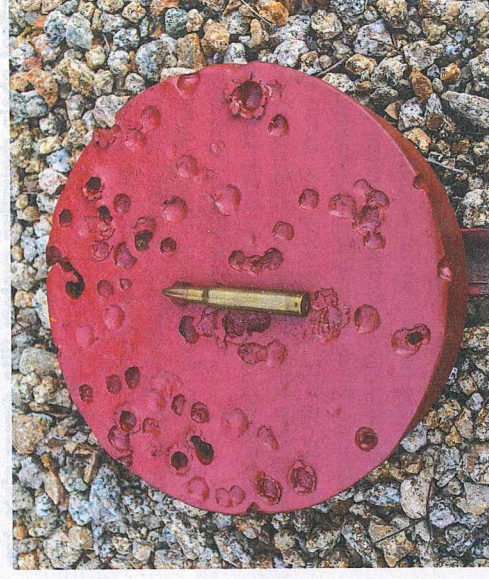
Safety is especially important when shooting at unregulated sites. Ricochets, backstop over-shoots, fire prevention, and prompt access to medical treatment are obvious concerns. Since access is uncontrolled, shooters must be watchful for the sudden appearance of hikers. Off-road motorcycles and ATVs are especially worrisome since target shooters wear hearing protection and riders can appear without forewarning.

There has been some debate on the internet about ricochets off metal targets. One website states, “one of the most common myths is that steel targets ricochet, leading to dangerous bullet fragments flying all over.” Well, as the saying goes, “it all depends.” Specifically, the caliber, type of bullet (e.g., lead, jacketed, metal penetrator), velocity, fixed or moving plate, distance to target, and angle of impact will determine the likelihood of ricochet.

The U.S. Department of Energy takes this issue very seriously and has published “Use of Bullet Traps and Steel Targets,” a 58-page guidance document. It states that steel targets are safer if they move on impact and are angled downward (i.e., top towards the firing line). What is especially dangerous is mild steel targets that have deep, cupped bullet impacts. Secondary hits on

the cupped craters can shatter and deflect fragments directly back towards the shooter.

The industry has taken these guidelines seriously. At the 2019 SHOT Show, products such as armor steel plate targets on moving and angled mounts, were displayed by companies such as Action Target (ActionTarget.com), AR-MOR™ (AR-morTargets.com), and MGM Targets™ (MGMTargets.com). Action Target showcased an angled steel target designed to safely handle the impact of the mighty 50 BMG. Take Aim Targets™ (TakeAimTargets.com) displayed their new forward-leaning model of the classic pepper popper that can be either fixed forward



Some mistakenly believe that bullets disintegrate on impact with metal and present no ricochet danger. Mild steel plate pitted with .30-06 rounds can “cup” and deflect shattered rounds directly back to the shooting line.



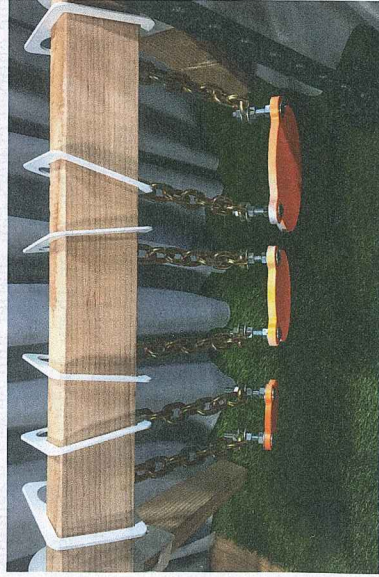
Fixed metal targets are not recommended today because of the danger of ricochets. This popper popper by MGM Targets (MGMTargets.com) tilts forward and also pivots.



A new pepper popper design by Take Aim Targets (TakeAimTargets.com) falls forward when hit to further reduce the likely hood of ricochet. It can also be locked in the forward tilting position.



Self-sealing polymer targets are now available from NewBold Targets (NewBoldTargets.com), which fall like metal plate targets and retain their integrity after hundreds of rounds. These are particularly useful for close contact training exercises where the danger from ricochet is high.

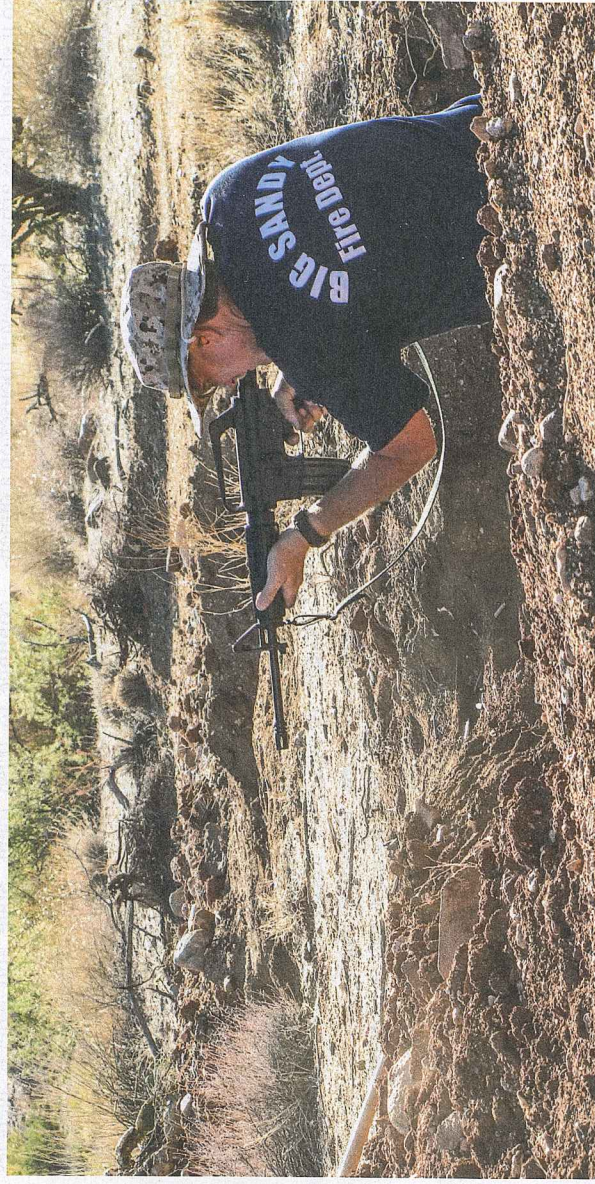


AR-MOR targets (AR-morTargets.com): this simple offset chain mounting system tilts armor plate targets to reduce ricochets.

or fall forward on impact, further reducing ricochets. NEWBOLD™ targets (NewBoldTargets.com) go even further by using a “self-sealing reactive polymer” that bullets will pass through.

Rubber tires are notorious for producing ricochets. But shooters may not be aware of just how frequently ricochets occur and how far they travel. Movies give the false impression that bullets spark on impact and will blow up anything containing flammable material. One of the few places in the United States, if not the world, where private citizens can safely witness real ricochets without Hollywood embellishment is the Big Sandy Machine Gun Shoot in Wikieup, Arizona. The nighttime tracer shoot is awe inspiring.

Big Sandy is zoned as an “event range” opened twice a year to the public. Remote and privately owned, it is located on over 600 acres of controlled access,



Shooting binary explosive targets, incendiary and tracer ammunition can present a significant fire danger. The Big Sandy shoot has its own fire department to minimize this risk. Members are professionals that volunteer and get to participate in events while on standby. (Photo courtesy Rob Lippert)

un-forested desert with not just a berm backstop, but a mountain. The site has its own airplane landing strip, fire department, emergency medical personnel, range safety officers and so on. Ideally suited for live fire training, the Big Sandy is used by the military and police, as well as movie and television production crews. And no wonder; there are no ordinance limits. Even 105mm rounds from an M60 battle tank and a 152mm Soviet medium cannon have been fired to the delight of spectators.

It is not just bullet fragments that can rebound off targets. Binary reactive targets such as Tannerite®, Thundershot® or Sonic Boom® can blast debris back at the line. Tannerite recommends that reactive targets be elevated above the ground to reduce the amount of flying debris and never be placed next to “surfaces that could produce flying debris.” It is not just debris that is a concern. Andrew Krywonizka, of Thunder-shot states, “All binary targets are capable of starting fires due to incomplete mixing of the activating powder

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that might throw off sparks. Shooters should avoid using binary targets around combustible materials such as dry grass, scrub, or deadfall." Big Sandy uses an array of these techniques to prevent fires from spreading and debris from reaching the line. In its five-year history, there has never been a serious injury or fire.

Public Outdoor Shooting Ranges

An estimated 9,000 non-military outdoor ranges exist in the United States, according to National Institute for Health (NIOSH). These public ranges, as well as gun clubs on private or public land are subject to a vast array of requirements and permits. Ranges that were once remotely located, such as the Ben Avery Shooting Facility in north Phoenix, are now surrounded by residential developments. Founded in 1957 and operated by Arizona Game and Fish, it is one of the largest publicly operated shooting facilities in the country.

Range Manager Christopher Dean states, "The Ben Avery site follows numerous guidelines such as noise at the boundaries, national and state best management practices for lead removal and disposal and other operating procedures based on our own studies. For example, a study by Kramer One, Inc. concluded that 50 caliber ammunition should not be shot at the range. Since 1999 we have voluntarily restricted these rounds."

The National Shooting Sports Foundation (NSSF) and the National Rifle Association (NRA) have published guidelines for establishing and maintaining these outdoor shooting ranges. Most states have incorporated these guidelines into their own policies and protocols. The Department of Defense and the Department of Energy have also developed their own guidelines. Taken collectively, they all have similar elements for:

- Best management practices for design (e.g., backstop, targets)
- Noise abatement
- Lead reclamation and recycling
- Erosion and runoff control
- Safety practices
- Range Safety management

The essential elements of an outdoor or indoor range are the same, especially when it comes to range safety. However, the cost differences can be significantly different between indoor and outdoor ranges. For example, noise abatement techniques at indoor ranges are well developed. Companies such as Troy Acoustics Corporation (TroyAcoustics.com) have developed designs and materials to meet OSHA standards, local noise ordinances, and UL fire resistance codes. Materials also minimize bullet ricochet and splatter. Noise from remote outdoor ranges can be simply handled by berms. Sometimes ...

A big issue with older outdoor ranges is encroachment by new homeowners who knowingly bought or built next to an existing shooting range, and now complain about the noise. As a consequence, some ranges have had to restrict shooting hours such as on Sunday mornings. There are technology solutions but, in general, they are not as effective and are costlier than those available for indoor ranges. For example, outdoor ranges can be baffled and canopied to



Lead remediation is expensive. A bulldozer moves the last pile of dirt with high lead content at the former Prescott Sportsmen's Club Shooting Range, April 18, 2017 in Prescott, Arizona. Cleanup costs approached \$1.6 million. (Photo courtesy Les Stukenberg at The Daily Courier)

reduce noise offsite or reverberations to the shooters. Sidewalls can be constructed with special materials to further reduce reverberations. For established ranges, unanticipated additional noise abatement investments can be challenging.

Getting the Lead Out

Maintaining a safe range for shooters (e.g., range safety control, backstops, targets) and being a good neighbor (e.g., noise control) are key success factors for private and commercial outdoor ranges. But, the primary focus in determining a range's long-term "sustainability" may be centered around environmental regulations, specifically on lead management. Numerous state and federal regulatory agencies have published detailed guidelines on how to successfully accomplish this, and the most cited reference is EPA's, *Best Management Practices for Lead at Outdoor Shooting*.

Lead exposure risk became widely recognized after medical professionals determined its impact on the health of children who chewed on toys or window sills that were painted with pigments containing lead oxide or chromates. It has a sweet taste. The CDC (Center for Disease Control and Prevention) states "Even low levels of lead in blood have been shown to affect IQ, ability to pay attention, and academic achievement." Lead was banned in paints used in homes in 1978.

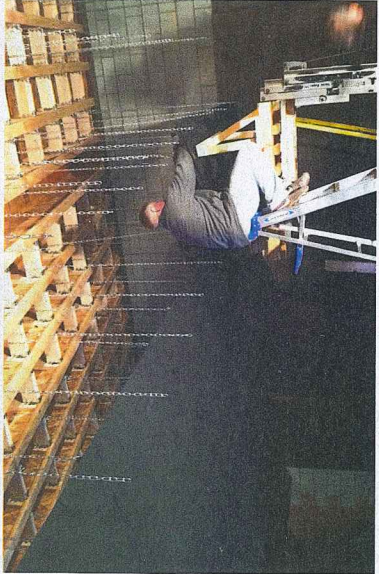
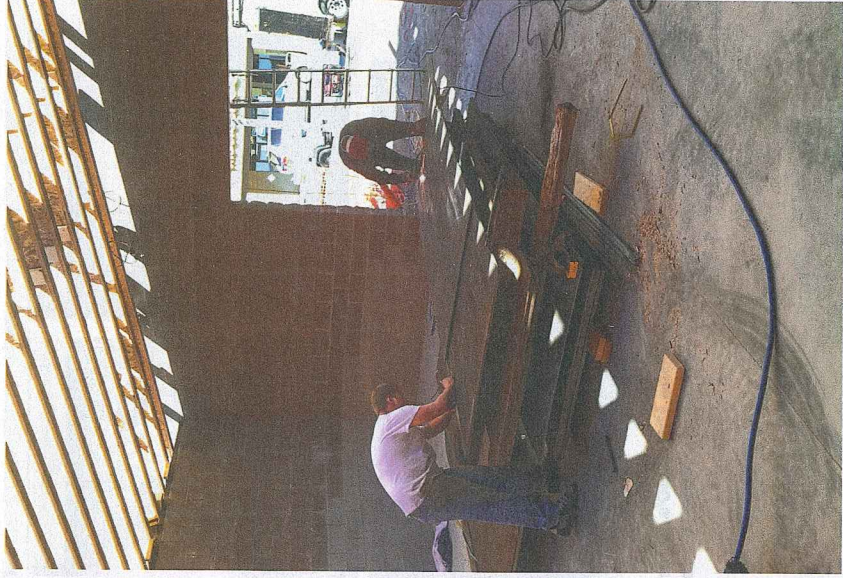
One will not find infants at ranges chewing on lead bullets, so what is the issue? NRA's Eric Whitescarver, Range Tactical Team Leader, explains, "The NRA is the national leader in shooting safety and has developed programs for children such as Eddie Eagle GunSafe®.

We recognized early on that there is more to gun safety than just safe firearm handling. NRA Range Source Book provides guidance on how to prevent the migration of lead from ranges and the proper removal and treatment techniques for lead. Our focus is on minimizing lead exposure in any form, on or offsite."

Dr. Dick Peddicord is arguably the country's leading expert on lead management at outdoor ranges and has helped write both state and EPA guidelines. He explains, "Environmental activity of lead at outdoor shooting ranges is dependent on several factors such as rainfall amount, the acidity and other characteristics of the soil, and so on. The good news is that this activity can be controlled cost-effectively by proper site design and management." He, along with agencies and organizations such as the EPA, NRA, NSSF, and many states encourage the use of an Environmental Stewardship Plan (ESP), essentially a written "road map" to plan, implement, monitor, and document environmental management at an outdoor shooting range.

Lead not properly managed can ultimately require expensive remediation, which can be even more expensive if it involves solid or hazardous waste. The Colorado Department of Public Health and the Environment's, Corrective Action at Outdoor Shooting Ranges Guidance Document states, "Although best management practices at an active range are not considered to be a waste management activity subject to regulation, they may result in the generation of solid or hazardous wastes if the soils or other wastes are treated or disposed of offsite."

Maria McGaha, Regional Environmental Engineer at the Forest Service's Southwestern Region provides



It may not be visible or obvious to shooters, but tactical shooting ranges such as the Prescott Gun Club use literally tons of ceiling mounted (bottom left photo) or wall mounted armor plate attached to or suspended from areas that might receive bullet impacts.

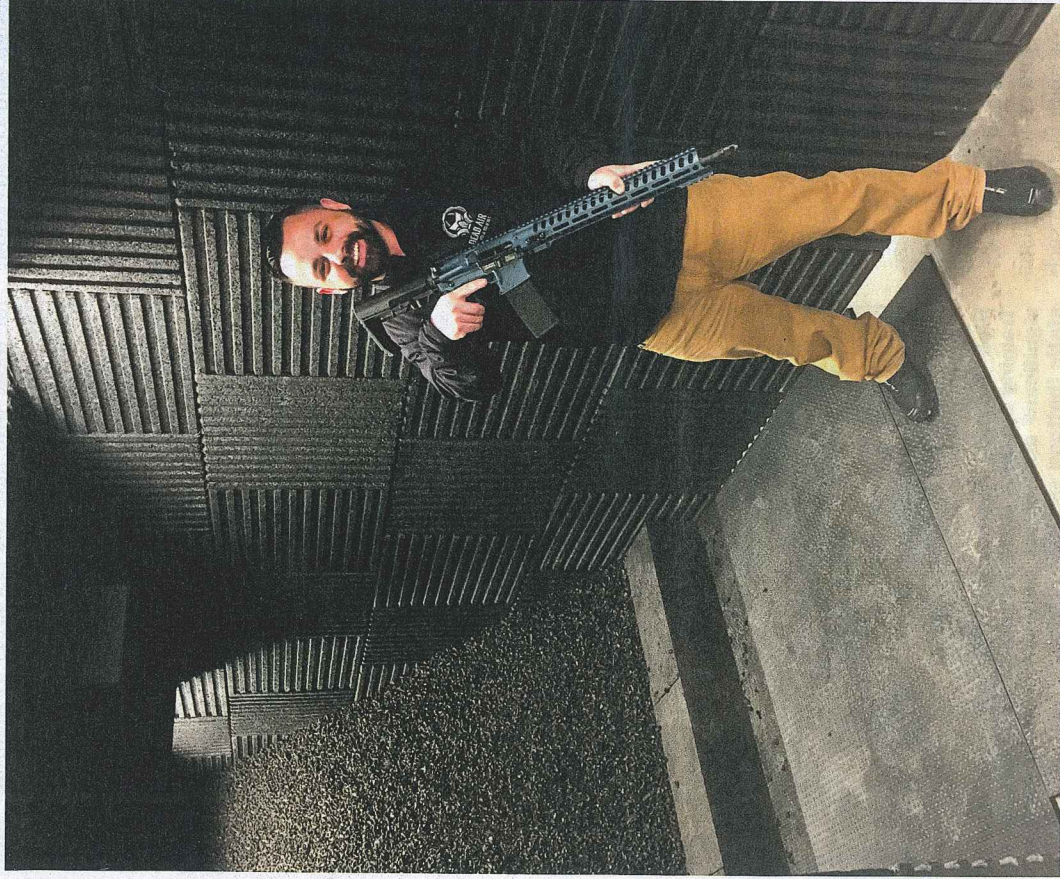
or concrete boxes with open lanes to shoot down. They are integrated structures with specialized ventilation systems, target control mechanisms, bullet capturing and lead recovery provisions.

Large private club or commercial shooting ranges may look similar (e.g., shooting stations, shooting target systems and a backstop) but there can be significant differences among them. High-end ranges can offer nearly unlimited shooting and training opportunities. Cost can vary significantly depending on the features offered. For example, tactical and static ranges may look identical to the untrained eye, but tactical ranges also allow a broad range of live fire training exercises that can not be safely done at a static range. Specifically, shooters are not limited to shooting from fixed firing positions. They can move down the line because of features such as closely spaced angled baffles that prevent bullets from exiting through the roof or ricocheting back toward the shooter.

Another major feature of modern range design which is not apparent to most shooters, is improved ventilation systems. There are two types: once-through or recirculation. Recirculation systems have a continuous fresh air makeup of approximately 25% (i.e., the air circulated past the shooting stations contains 25% fresh air intake). In extreme climates, recirculation is preferred for energy saving. In both designs, air goes through a series of filters including a HEPA filter (High-Efficiency Particulate Air) prior to recirculation or discharge.

Range areas are maintained at a slightly lower pressure than the office, training rooms and retail area to prevent dust migration into these locations. The National Institute for Occupational Safety and Health (NIOSH) specifies that a flow rate of 75 feet per minute (fpm) is needed to move air downstream from the firing line to the bullet trap, about the same flow as a gentle breeze. NIOSH also specifies that range employees who might be exposed to fine lead particles during cleaning should wear protective dust

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Patriot Ordnance Factory (POF-USA.com) uses a specialized firing range by Range Systems.com) to function check each new firearm. While only a few feet in length, the crumbed rubber (right photo) is able to absorb rifle rounds without the danger of backsplash.



an example, "It cost nearly \$1.6 million dollars to close a relatively small range on US Forest Service property in Prescott, Arizona. The Prescott Sportsman Club site was built in 1957 under a special use permit on 25 acres leased from the Forest Service."

Elizabeth Dykstra, the Southwestern Regional Recreation Special Uses Program Manager, explains, "A Recreation Special Use Permit under standard FS-2700-5c is required and it contains an action plan to monitor any lead contamination and measure the success for a clean environment during the holder's use and occupancy of the site."

The NSSF (National Shooting Sports Foundation) has for over 15 years promoted safe and proactive management practices related to OSHA and EPA compliance. For example, they have established collaborative efforts with these government agencies during the Bush administration to develop NSSF publications on such topics as lead management, the environmental aspects of construction and management of outdoor ranges and OSHA compliance for indoor ranges.

The NSSF continues to develop new resources to assist ranges on steps that should be considered when building upon their existing EPA and OSHA compliance / management practices. NSSF has also established a certificate program with the EPA to recognize ranges that developed ESP's that were reviewed and accepted by EPA. Zachary Snow, Director of Retail Range and Business Development for the NSSF, is the point of contact for learning about these ongoing efforts.

INDOOR RANGES

The Good Old Days

In just a few generations, access to places to shoot safely and the public's reaction to armed young individuals have changed dramatically. For this author, as with millions of others his age, access was as uncomplicated as a walk down the neighborhood sidewalk with an uncased BB gun, .22 rifle or .410 shotgun to a nearby field. This same scene today would more than likely result in multiple 911 calls and swift police "intervention."

For adults, easy access to a safe place to shoot high-powered firearms in densely populated areas has been an enduring need, especially for the police, military, and gun clubs. Indoor shooting ranges provided the practical solution and some of the earliest were built by Caswell International which was acquired by Meggitt Training Systems (MeggittTrainingSystems.com) in 2003. Today, there are conservatively over 10,000 ranges across the country. The NRA offers the "National Registry of Places to Shoot" at <http://findnra.nra.org> to help shooters locate local ranges.

As with outdoor ranges, location is a primary consideration in whether or not an indoor range will be successful. Shooters want to spend their time shooting and not sitting in traffic jams or driving excessively long distances. Obtaining an ideal distribution of ranges that adequately meets shooter demands is increasingly more challenging because of restrictive zoning ordinances and considerations such as the



Ranges have come a long way since the 1920's when this one was built by Caswell International, now Meggitt Training Systems (MGMTargets.com). Note the lack of eye and hearing protection. (Photo courtesy Meggitt Training Systems)

rising costs to design, permit, construct, and operate modern ranges.

Not Like Your Father's Range

The 2019 SHOT Show in Las Vegas showcased emerging trends in range design and construction. Ranges built by Caswell a hundred years ago only remotely resemble indoor ranges built today. Other industry leaders at SHOT Show, such as Range Systems (Range-Systems.com), Action Target (ActionTarget.com), Paragon Tactical (ParagonTactical.com), Savage Range Systems (SavageRangeSystems.com), Meggitt (MeggittTrainingSystems.com), and D5 Ranges (d5ranges.com) offer a variety of features to enhance ventilation, efficiently capture lead at the backstop, abate noise, improve lighting, and design more realistic, engaging, and user-friendly shooting target systems.

Range design, construction, and modernizations can be turnkey operations under the management of a single contractor such as Action Target that handles all aspects of the project. But most, including the industry's majors, subcontract to experts that design specialized elements. For example, Carey's Small Arms Range Ventilation (CareysCentral.com) is an industry leader in ventilation system design. MT2-Firing Range Services (MT2.com) is a front-runner in firing range services for lead recovery and remediation. Troy Acoustics provides acoustical designs that meet OSHA, UL, local noise ordinances and the National Institute of Building Sciences "Whole Building Design Guidelines."

Range Variants

There is a wide variation in indoor range size, design, and functionality. At one extreme are the small bullet traps used for clearing weapons as well as specialized traps used by gunsmiths and forensic scientists who check functionality and conduct ballistic comparisons, respectively. Major manufacturers such

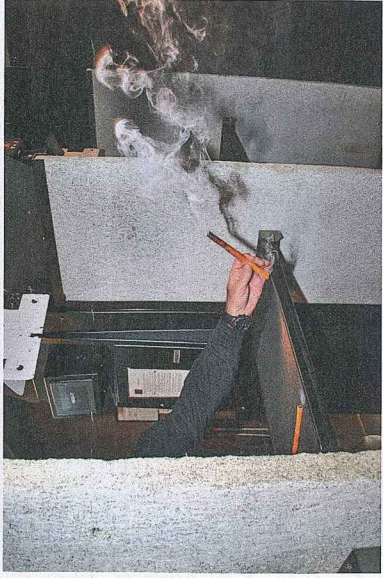
as Patriot Ordnance Factory (POF-USA.com) use specialized ranges such as those designed by Range Systems to conduct both function and accuracy testing and to demonstrate products to customers. Range Systems also now offers custom indoor home ranges for those who have the resources to ramp up "show and tell" time with friends beyond just exhibiting the guns or trophies that they own.

In the midrange are the "shoot houses" employed by military and law enforcement for realistic close-quarter training in enclosed areas. Action Target is a leading provider of shoot houses, offering the MATCH™ (modular armored tactical combat house) for live fire training and the TAC House™ (tactical ammunition combat house) for training with non-lethal training ammunition. The public can also have access to indoor simulators by enrolling in training courses at well-equipped institutions such as Gunsite Academy in Paulden, Arizona.

At the other extreme are full-size, multi-station indoor ranges. These ranges are not just simple steel



Nick Patrick, Engineering Manager with Meggitt Training Systems (MGMTargets.com), points out the significant differences between tactical (top) and static (bottom) shooting ranges.



Government agencies such as NIOSH recommend positive ventilation that will draw shooting fumes away from the shooting stations and minimize exposure to lead particles. It does not take much, just the equivalent of a gentle breeze.

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respirators. Companies such as Nextteq and Dräger manufacture smoke generation tubes that can quickly test for both airflow and respirator mask fit.

Lastly, the backstop. Historically sand berms or metal backstops were the norm, employing either a deflection plate into sand or water or a series of more compact “venetian blinds.” Each has their advantages (e.g., cost) and disadvantages (e.g., lead splatter and recovery). There are two basic types of backstops commonly used today. First, armor plates that deflect and funnel bullets toward a deceleration chamber, allowing bullets and fragments to decelerate until they exit into a collection system. Second, a rubber berm trap that consists of an inclined wall of chopped rubber that absorbs the bullets without ricocheting fragments back to the firing line. Again, each has its advantages and disadvantages, especially when it comes to lead recovery and removal.



Some range backstops employ baffles to deflect bullets to devices that spin and deaccelerate bullets into collection tanks. This design is made by Action Target (ActionTarget.com).

Lead Exposure

As described earlier, the focus at outdoor ranges — aside from safety considerations and noise control — is prevention of lead release to the environment. Natural (i.e., outdoor) ventilation minimizes an individual’s exposure to lead. Bullet capture, stabilization (e.g., ECOBOND® Technology by MT2- Firing Range Services), runoff capture, soil acidity and permeability reduction, and recycling are used to minimize lead release to the environment.

Indoor ranges have similar issues, but noise issues within the community are minor in comparison since noise can be more easily controlled within the confines of a building. As with noise, lead can also be more easily contained within a building through dust control and exhaust air filtration. Individual exposure to fine lead particles within the building is of greater concern than release of lead to the environment.

Fortunately, as with outdoor ranges, technology and maintenance routines mitigate both noise and lead exposure.

Thanks to proper ventilation and modern range equipment, shooters are rarely exposed to significant levels of lead dust in properly ventilated indoor ranges. The concern is for range safety officers who are at the “front line” for hours each day and could be exposed to lead at the firing line or during collection and removal of lead from the building (e.g., exhaust filtration and dust and bullet cleanup). These individuals should receive routine blood level tests.

Indoor range employees typically use a dedicated set of clothing and footwear at the range. These are cleaned separately to minimize exposure at home, especially if they have young children. The regulating agencies for lead in the environment is the EPA, but for personnel exposure it is NIOSH (National Institute for Occupational Safety and Health) and OSHA (Occupational Safety and Health).

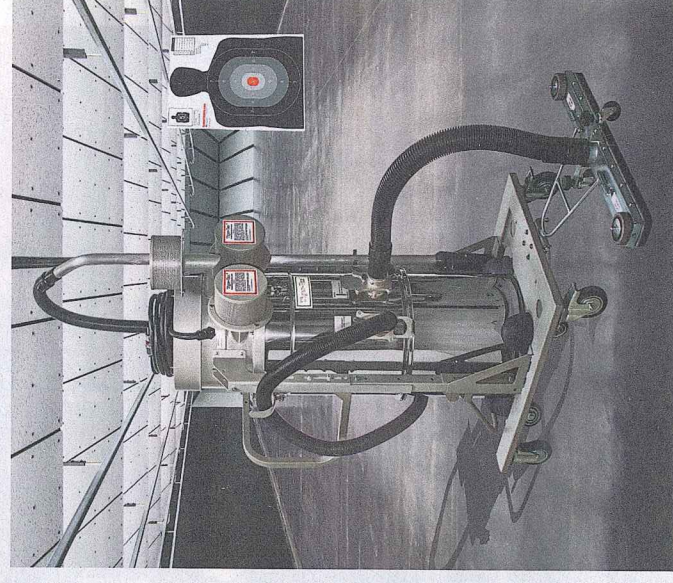
As already stated, HEPA filters do the bulk of the fine lead particle removal from the general range area. Companies such as MT2- Firing Range Services, On Target Range Services (570-223-2220), Range Recovery Technologies (RangeRecovery.com), and others handle filters disposal and lead recovery. Pushing around a dry broom is not recommended. Limited wet mopping is one alternative.

There are also specially constructed explosion proof dry vacuums that can suck up lead dust. What many readers may not realize is that regular vacuums are not safe to use since there are small quantities of unburnt powder in the dust just beyond the shooting stations. Fine lead particles are also generated as bullets impact on one another at the backstop and these

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Modern Ranges such as Crossfire Defense Academy in Flower Mound, Texas deploy advanced target systems such as the AutoTargets, featuring hit detection technology that are wirelessly controlled via a downloadable app.” (Photo courtesy of Action Target, Actiontarget.com)



Looking like some high tech R2D2 robot, this explosion proof vacuum from Tiger-Vac (Tiger-Vac.com) is used to remove not only lead particles but also the unburnt powder that can accumulate in front of firing stations. (Photo courtesy Tiger -Vac)

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are more difficult to recover and recycle according to James Barthel of MT2- Firing Range Services who indicates, "There is money to be recovered in the bullets themselves. But the fines generally cost money to remove and dispose of."

Lead contamination of the building itself due to poor ventilation design and/or maintenance can also be a significant cost consideration. For example, Bill Provencher with Carey's Small Arms Range Ventilation is familiar with a contaminated range that required an approximately \$600,000 before a bank would loan money to a new owner wishing to take over the business. Today it is clean and back in business under new management. Again, be it indoor or outdoor, lead remediation is expensive.

It's Not Over Until the Permit Arrives — A Tale of Two Cities

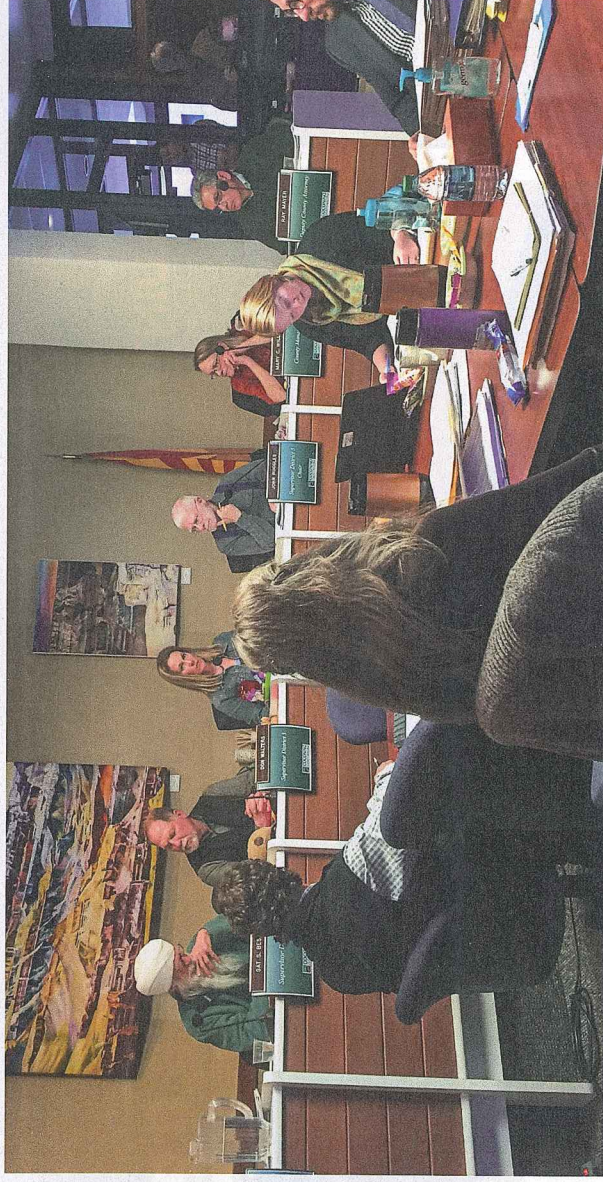
Building and operating a new indoor range can be a challenge. But that may be the easiest part of the entire process starting from design concept to the first shot downrange. The task of securing permits at the local, state, and federal level can range from routine to mind-numbing. It comes as no surprise that this challenge can vary from state to state. In October 2018, *Guns & Ammo* magazine ranked Arizona as first in gun-friendly states and New Jersey as dead last. Building a new range in Arizona should be easy. Right? Not necessarily.

The Prescott Gun Club in Prescott, Arizona is an eight-station full tactical range and built in 2015 using state-of-the-art Meggitt Training Systems equipment. It has a retail showroom, training rooms, and office areas. Prescott's political climate is excellent for commercial development and Prescott's firearm and FFL ownership rate are among the highest in the nation (see *Gun Town, USA* in the February 3, 2014 issue of *Shotgun News*). The permits for Prescott Gun Club processed smoothly through City Hall and Donald Grier, states, "*The biggest delays we faced were due to heavy rains during construction.*"

Less than one hundred miles away is a city of comparable size, Flagstaff, Arizona. This city reacted in 2015 to the permit process for Timberline Firearms and Training as if the city were located in New Jersey. A university town and called by some the "Berkeley of Arizona," the owners, Bob and Elise Wilson, struggled for three years to get a "Conditional Use Permit," which they finally received near the end of 2018. They put their life savings on the line for years without any assurances of success.

Profit

The reader by now should have the impression that ranges are expensive to build, own, and operate. But are they profitable? Yes, they can be, but the elements that contribute the most to the bottom line are not associated with range fees or even gun sales. Leading ranges such as those already mentioned and modern ranges such as C2 Tactical® make the most profit from selling accessories and conducting training. Some, such as C2 Tactical in Scottsdale, Arizona and Ally Outdoors in Midland, Texas, offer VIP members-only shooting ranges — informally referred to as "guntry



Even in gun-friendly states like Arizona the steps needed to secure necessary building permits for ranges can be a daunting. It took an enormous effort on the part of Timberline Firearms and Training to build strong local support that was willing to show up at public hearings and offset criticism. (Photo courtesy Timberline Firearms and Training)

clubs" — that offer access to meeting spaces, lounges, pool tables, lockers and even restaurants.

Not surprisingly, state law changes in concealed carry (e.g., shall issue permits, constitutional carry, and reciprocity) have provided a boost to commercial ranges and gun clubs. In particular, the rise in women shooters and organizations such as The Well Armed Woman (TheWellArmedWoman.com) and the Shooting for Women Alliance (MySFWA.com) have been important factors in the increase in first-time gun buyers and concealed weapons training.

What You Can Do

First and foremost, do your part to clean up public shooting spots. Trail hikers and backpackers have a motto, "Pack it in, pack it out." This philosophy must be embraced by all target shooters or we will gradually lose our access to public and private lands. The very few who trash our land can ruin it for all of us.

Second, support the NSSF and NRA as they have very active programs to sustain existing, and increase

our access to new, shooting ranges. These organizations are at the forefront of keeping the range employees, shooters, and the environment safe.

Third, support local ranges. Most commercial ranges have showrooms for guns and accessories. Think twice about saving a few dollars by purchasing these items elsewhere; their survival depends on the profits from these sales. And for both commercial and private clubs, the training opportunities are important revenue sources.

Fourth, encourage the range that you use to employ modern range practices in noise abatement and lead capture and recycling. This series has outlined many of these practices and there is a tremendous wealth of online information available through the NSSF, the NRA, state and federal organizations, and range industry leaders.

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Women interested in self protection have been a major new revenue source for shooting ranges. Gun Sales and training add to the bottom line. (Photo courtesy C2 Tactical)