

Petzl EXO 'bail-out' system

After tragically losing two firefighters, and having four others injured, three severely, in an incident in January 2005, the FDNY began an intense search for a personal (escape) safety system for their firefighters. They were intent on finding/developing a *system*, not a device. After testing a multitude of decent control devices, with almost every kind and size of rope available, they began concentrating on the Petzl GriGri as the basis for the system. Interestingly, during the initial comparison testing the GriGri was set aside. Perhaps because the rope needed for it to operate correctly, was too large to be practical. Later of course, it was re-evaluated and Petzl began to take

part in development with FDNY, modifications were made to allow lighter rope to be used, and the EXO Personal Safety System was born.

CONSTRUCTION

The kit consists of a specifically designed pack to house all the components. Fifteen meters (50') of Technora 7.5mm rope, a Petzl 'OK' triple action aluminium carabiner, the EXO descent control device and a large red hook for anchoring. To make it all work properly an "A" frame type, class II sit harness is needed. Each of these components was selected, or designed and modified after literally thousands of trials by the FDNY and Petzl.

The carry bag is made of a Kevlar/Nomex blended fabric which allows it to withstand heat and take some abuse. It is designed to sit on the wearer's right side and protrude as little as possible. Most turnout coats will partially or completely cover it. It has several compartments which separate the rope, the EXO, and the hook. The rope is first to be packed and is carefully loaded in a zigzag pattern in the main compartment. There is a (carry) flap at the top which folds down and secures with Velcro, to keep the rope in place and separate it from the EXO, which lies on top. It is wise to not let the EXO reside with the rope. This keeps the EXO from sinking in the rope compartment and becoming entangled. The EXO is then laid on its' side on top of the carry flap, (red side up, cam down), and is secured in place by a small Velcro tab through the permanently attached carabiner.

The hook, with about 20cm (8") of slack rope between it and the EXO, can then be placed in the hook



by Greg 'Church' Churchman

Fig1



SPECIFICATIONS

COST: \$350.
ORIGIN: France & USA
WEIGHT: 3.75 lbs / 1.7kg
ANCHOR HOOK:
 18cm (7") x 7.5cm (3")
 One piece drop forged steel
Weight: 0.4g (13oz)
Strength at tip of hook: 2270kg/5000 lbs
Strength in spine: 4536 kg/10,000 lbs
ESCAPE LINE:
 100% Technora Fibres
 7.5mm kernmantle
 Saw eye termination at hook
MBS: 25.6kn/5756 lbs

High heat and cut resistance.
 End of rope is knotted and sewn to prevent descending past the end. Rope length is 15 m/50 ft. A nice compromise between how much rope you are required to carry and the distance you can rappel, among other things. It is meant for escape from an unstable environment not necessarily to descend to the ground.
CARABINER:
 Aluminium triple action self locking
MBS: 27kn/6070 lbs.
 Captive bar keeps carabiner oriented correctly and attached permanently to EXO.

pocket on the outside of the rope compartment, and the main flap may be closed. The main flap is secured with Velcro, and covers the EXO and hook. The carabiner attached to the EXO will be partially exposed, and must be attached to the wearers harness.

HARNESSES: Currently there are only two harnesses, that I am aware of, that are compatible with the EXO. These are class two sit harnesses

made by Gemtor and RIT. Petzl will have their own matching harness available soon.

EXO: Patterned after GriGri but... ..:

- The friction plate was thickened and triangular flange removed.
- The spring was removed from the cam lever.
- The lever arm is now made of aluminium and shortened.
- Rope guides were added to the cam lever and the side plate.

- The EXO is designed to work with 7.5mm rope.

IN ACTION:

To enable the EXO to deploy properly it must be packed correctly. It takes some practice, but it isn't difficult. Not as hard as stowing a parachute, but just as important.

To use the EXO the main flap is located and pulled up firmly, making sure it is completely open. The hook is removed from its' pocket with the right hand, and then with both hands it is pulled forward abruptly. You need to make sure that the EXO has cleared the carry bag. Once that is confirmed, if more slack is needed between the EXO and the hook, the EXO cam is depressed with the right hand, the left hand holding the hook is extended, and rope passes through the EXO.

At this point the EXO needs to be anchored and this is where the hook really excels. Any number of items may be used to tie off to, or attach the hook to very quickly, and exit. The hook allows for some very fast and reliable anchoring, but it can also release if it is not employed correctly. As with most things in the fire service, it takes some training, and practice, and then some re-currency training and then some more practice. We'll return to this subject later.

The hook is ingenious and took some nerve to incorporate into the system. It more than compensates for possible shortcomings, with versatility. It allows the user to attach to any suitable anchor very securely by wrapping the anchor once with the rope, and tying off to the hook, with a clove hitch. The FDNY uses a nearly foolproof method of tying the clove hitch that works while wearing bulky gloves and/or while vision is obscured (fig3)

When it is not possible to tie off this way, the hook can be connected directly to any appropriate anchor that its bowl or saddle will fit around. For example, a suitable pipe, radiator, door jamb, door hinge, window sill, etc. (Fig4-6). When the hook is clipped to an anchor without being tied off, tension on the rope must be maintained during the exit, to prevent the hook from releasing. This would be a good habit to develop regardless, but it is critical when the hook is not tied in, and you want your departure to go as planned.

Of course these are not the only anchor possibilities. If you have wooden floors a hole may be



Fig 2



Fig 3



Fig 4

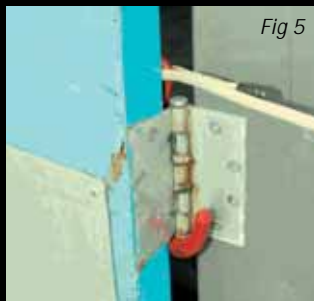


Fig 5



Fig 6



Fig 7



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punched through with an axe tip, halogen tool, etc, and the hooks tip slipped through. If the ceiling is accessible, trusses can be used.

Fig7. A forcible entry tool can be placed across the lower corner of a window and used as an anchor point. The possibilities are numerous, the main difference being that some are more precarious than others.

This is where training becomes essential.

which you would surely have had to do. It is also proven curriculum, having been developed and thoroughly tested by the FDNY and Petzl. Knowing how litigious society is today, I now view Petzl's training requirement as a major plus.

Petzl is only allowing persons that they certify and endorse to conduct the training. This doesn't mean that a department must hire a Petzl instructor to train all of their personnel, although that is a



Personnel with prior rope experience may take the training in stride. Others may find it to be quite foreign and find some of the anchoring choices and the exit technique harder to grasp. Regardless of prior experience, the hook requires special training and diligence. This is definitely not gear that can be issued and forgotten.

Initially, when I was told that Petzl would require purchasers to undergo Petzl's authorized training before being allowed to buy the equipment I was surprised. I thought it would hinder sales of the item. We are used to being provided with instructions for use, but I don't recall any firm requiring mandatory training. In retrospect it would seem that it was a very intelligent decision. This equipment necessitates training before use, and re-currency training at least yearly. So I assume that Petzl recognized the need, and opted to do the responsible thing, even if it reduced sales. Of course looking at it from a department's perspective, it is actually a bonus. Now you are not responsible for building a training program for the equipment,

legitimate choice for smaller departments. It means that you must at least have your designated trainer(s) undergo Petzl training, and they can then provide initial and re-currency training to their own department. They will not be allowed to provide training outside of their department, but that shouldn't be an issue.

So why do we need escape kits? Is this the latest fad or a necessity? What has changed that is causing more of our people to get deeper into trouble than may have been the case only a few years ago? Are we not teaching firefighters enough so that they know when to backup? One recurring opinion that I hear is that the quality of equipment is allowing us to advance farther into trouble spots. We didn't used to be covered head to toe, and the thermal quality of clothing wasn't quite as good. The reply is that we now have temperature alarms to warn us. But they only tell us so much. The bottom line is it doesn't really matter why. The escape kits are a solution to part of the problem. Some would suggest that they can be as dangerous

as the hazard that they are designed to alleviate. I would counter that with proper training in their use, this is not the case. The key is training.

What about the hook versus the carabiner. Isn't a carabiner just as effective? The short answer is no, not if it is applied as it is supposed to be. You can make a carabiner do a few of the extra things that the hook can do, but not without misusing it.

So is this a perfect system? No of course not. With training it is safe and very effective. The hook misapplied can create a problem. You must also be certain that the EXO clears the outside of the sill that you are exiting from, before you load the system. If the EXO gets hung up on the sill, it can be very difficult to dislodge and continue descending. If stuck, it also makes a difference as to which part of the EXO is accessible. If the cam and release handle are operable it is a simpler problem to resolve than if they are not. One attribute that seems odd is that currently it favours right handed users. It is not reversible and should not be worn on the left side. I don't believe this is of great concern to left handed users; at least there haven't been any organized protests to date. If sales warrant it perhaps they'll make a left handed version. Or not!

The price of the unit makes it the most expensive kit of its type on the market, as far as I am aware. Some legitimate comparison shopping should explain that. You will also need to purchase a compatible harness, but other kits require them as well. And of course there is still the cost of the initial training through Petzl which must be considered. I will make clear at this point that Petzl does not profit from this required training. Although they charge a fee for their instructor's course, I expect that it operates at a loss. They definitely don't make anything from the fees charged by the instructors that they certify.

Most of the EXO's positive attributes have been mentioned already. I will add that I believe that for this particular application, most personnel are better off with a descent control device that will stop their descent automatically, without their input, as opposed to a device that requires hand control at all times. It is a topic that may fuel some forum debates, perhaps it already has. I will just say that for

those personnel that have not had much experience on rope, and probably won't, it is an important additional safety feature. Certainly this is not the only legitimate reason, but a good one.

This kit works. I have witnessed five man squads exit the same window, anchoring at the sill, in full turn out gear and with vision obscured, in less than 45 seconds. And they could have been quicker.

In Canada in just the past year, we have had several extremely serious incidents. In Winnipeg two experienced fire officers were killed in a residential fire. Four others were injured, one severely.

In Ottawa five firefighters were forced to leap from the third floor of separate residential buildings, at the same alarm, all survived. One Lieutenant was badly hurt and hospitalized.

In Toronto, an entire crew were forced out of a second floor window of a residence and momentarily trapped on the roof of the first floor.

In all of these cases, an escape kit of some kind may have resolved the issue before it became a life or death situation. My experience with departments is that for the most part they are reactive in nature. To be fair, it isn't possible to see every danger and there are legitimate financial constraints. No one has an unlimited budget. However, when individual firefighters are willing to spend their own money on bail out kits, or the components to make their own, then you can be sure there is a real problem.

Unfortunately, when personnel begin to ad lib with their protective gear it can be a recipe for disaster. It is important to be using proven equipment, with training, for safety and legal reasons, for the individual and the department.

The question is; is it time to make escape kits a standard part of a firefighters gear. I believe it is. Some European departments have had them for years. More North American departments need to take a hard look at them also.

AUTHOR: Having recently retired as a Technical Rescue Training Captain with 23 years experience in the fire service, Greg Churchman is now the president of Rescue Consulting Canada Inc. He provides basic to advanced high angle and confined space training to Police, Fire and Industry. www.resconcanada.com



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Photo: Jarek Ciler, Rescue in Ski Resort (Giant Mountain)



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