FDNY Tools and Equipment in the 20th Century

by Battalion Chief Raymond M. Downey, SOC

As we look back at the firefighters of the early and mid-1900s, we often wonder how they accomplished some of the most difficult firefighting tasks with the tools and equipment available to them in those days. Modern technology seems to have given the firefighters of the late 1900s an advantage with the capability and resources available to meet most challenges.

One common trait of firefighters--regardless of what decade they were members of the FDNY--is their unique, innovative ability to design and produce or adapt commercial and industrial tools and equipment for use in the fire service. This capability still exists as we enter the 21st century. Names such as Sunila (Forcible Entry Tool), Lorenzo (Lorenzo Ladder) and Kelly (Kelly Kart) are familiar and have been with us in the second half of the 20th century. But a name that has been around even longer is Halligan (Halligan Tool).

Here, then, are some of the most useful or important tools of the century used by the FDNY:

Halligan Tool In an article that appeared in both the April 1950 and 1st/97 (reprinted) issues of *WNYF*, Hugh A. Halligan, who was a Deputy Chief and then First Deputy Fire Commissioner (he served with the FDNY from 1916 to 1959), wrote that during a cellar fire in a frame building that extended to the upper floors, the disadvantages of using the heavy claw tool (the forcible entry tool at that time) to open walls and partitions was the impetus for him to find another tool that could do the same work as the claw tool, but be lighter, more effective and induce less fatigue in the firefighters.

The Halligan Tool has myriad uses and provides firefighters with a lightweight, strong tool with a solid feel.

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The design of the tool enabled the ladderman (aka "truckie") to have three driving heads (the adz, hook and fork, referred to by Halligan as the claw), compared to the off-center hitting capability of the claw tool. All of the design features provided firefighters with a lighter, yet stronger, tool, with a solid feel that permitted long operations without fatigue and in comparative safety.

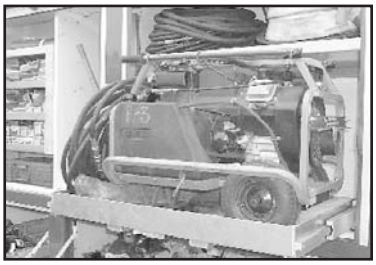
The tool is used for forcible entry, leverage in lifting and moving, prying, as a shut-off key and more. A list of its possible uses would fill this page. The versatile Halligan Tool is carried by Engine, Ladder, Squad and Rescue Companies. A favorite tool of firefighters, it should be with us for many a year into the 21st century. (See Forcible Entry Notebook by Captain Robert Morris (4th/98 and 1st/, 2nd/, 3rd/ and 4th/99 issues of *WNYF*.)

Thermal Imaging Camera Since the early 1980s, the FDNY has had thermal imaging capability. A thermal imaging camera is a device that translates a thermal picture into an electrical picture and then converts it to a visual image for the human eye. Thermal imagers provide vision capability with zero light present and thermal energy allows it to travel through smoke and mist. Only in the past decade has its value fully been recognized.

The Department originally purchased thermal imaging cameras for the Rescue Companies and Haz-Mat Co. 1. The first model purchased was the EEV, which the Navy had purchased in mass quantities for shipboard firefighting. As expected, they proved very helpful in locating fire and heat sources in our daily operations. Gradually, the EEV is being phased out. However, the Department counts the ARGUS 2 and Lifesight Cameras among its resources. Additionally, the Department is testing four other model cameras for future use.

(Right) Model EEV thermal imaging camera, now being phased out of use by FDNY. (Below) Firefighter demonstrates the newer, ARGUS 2 camera. The camera permits firefighters to view images through smoke and mist.

The Stanley Hydraulic System This hydraulically operated, multi-function, versatile tool is capable of doing everything from pumping 800 gallons per minute using a trash pump during flooded conditions, to penetrating concrete using a 15-inch diamond chain saw. Powered by a single- or dual-circuit system, it can supply one tool at a time or two when using the dual system.



See the 3rd/99 issue of *WNYF* for an in-depth article on The Stanley Hydraulic System by Battalion Chief Raymond M. Downey.

Small enough to fit in the back of a Surburban, its complement of tools includes a 70-lb. breaker (demolition hammer), hammer drill--capable of drilling up to two-inch holes in concrete or rock, 800-gallon trash pump, 500-gpm dewatering pump, 14-inch cut-off saw, diamond chain saw and other components. The Stanley Hydraulic System is carried on TAC 1 and 2, Rescue 1 and 3, Squad 1, Technical Response vehicle and the dewatering unit.

Portable power saws In the early '70s, the Department initiated a program to find the most efficient power saw for fire operations. The original

(Right) The Partner saw has become the power saw of choice for the FDNY.

program tested four different saws--the Partner, Master (McCulloch), Homelite and Target-Quickie saws. All four came equipped with three blades--a carbide tip for wood, roof tar, etc., aluminum oxide tip for steel, heavy metal, etc., and silicon carbide tip for concrete and masonry.

Eventually, the Partner saw was selected as the Department's choice. Over the years, the saws have been used in numerous kinds of operations. A second saw was issued for use with the aluminum oxide blade and is employed very effectively for cutting locks, bars, etc. As we enter the 21st century, most Trucks, Rescues and Squads have three saws as part of their tool complement.

Air Bags For the FDNY, the early '80s began with another unique and versatile piece of equipment that has become an important part of our specialized equipment. Air bags are constructed of neoprene rubber, reinforced with steel. In this respect, they are similar to a steel-belted radial tire. When inflated with air, they are designed to lift and move heavy loads. They can be used in a variety of ways--lifting collapsed floors, moving and lifting cylindrical and odd-shaped objects, on elevator doors and in subway trains and vehicle operations.

Air bags have proved their usefulness many times, lifting odd-shaped objects, to effect rescues.

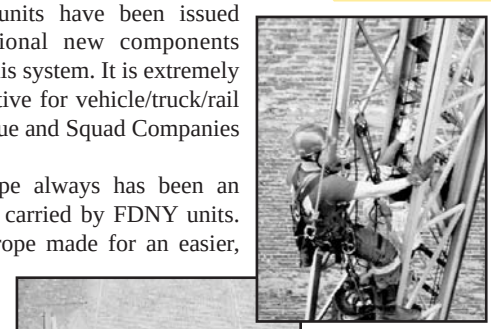
The standard air bag system, carried by Ladder, Rescue and Squad Companies, includes bags ranging in size from six- by six-inches to 36- by 36-inches. Additionally, special hi-lift, low-pressure bags are carried by Haz-Mat Co. 1 and some Rescue Companies.

Firefighter employs Hurst Tool to spread car doors to rescue a trapped victim.

Hurst Tool (aka the Jaws of Life) This high-powered, self-contained, hydraulic spreading, pulling and cutting tool has been an important part of specialized tools used by Ladder, Rescue and Squad Companies. Originally designed for vehicle extrication, the tool has been used in a variety of operations; i.e., lifting and holding loads, spreading fence and window bars and cutting re-bar, light steel, etc. The standard components include the power unit, jaws, cutter, rams, multi-tool manifold, chains and hand pump. Certain special units have been issued additional new components for this system. It is extremely effective for vehicle/truck/rail incidents and accidents. All Ladder, Rescue and Squad Companies carry these tools.

Lifesaving and High-Angle Rope Rope always has been an important lifesaving piece of equipment carried by FDNY units. The changeover from manila to nylon rope made for an easier, lighter, more compact system with backpack carrying case that members use on a daily basis. Each year on Medal Day, our members are honored with medals for heroic acts involving rope rescue.

In addition to the 150-foot lifesaving rope, which is carried by all units, kern-mantle high-angle rope is carried by all Rescue and Squad Companies. This rope is used for rescues that exceed the capabilities of the manila rope, as well as for more difficult lowering or raising operations or reaching victims below or above grade.



(Photos right) Rope has played a major role in some of the more dramatic rescues made by FDNY members.

The Hydra-Ram is a one-piece, integrated, hydraulic forcible entry tool. It is issued to all units.

Forcible Entry Tools The evolution of forcible entry tools has come a long way from the time of brute strength to modern technology. We are familiar with the Kelly Tool, the claw tool, the Sunila Tool, the K-tool and the Rabbit Tool. Currently, FDNY issues all units the Hydra-Ram, a one-piece, integrated hydraulic forcible entry tool. Engine Companies have been issued the tool for forcible entry during CFR-D runs. The tool weighs only 12 pounds and is 13 inches long. With no hoses or auxiliary pumps, the tool can be placed in any position--even upside down--with no adverse effect on its operation. Ten thousand pounds of force are presented at 138 pounds of pumping to acquire 3/4-inch per stroke to a maximum thrust opening of four inches. The tool is carried in a bag with shoulder strap, freeing the hands for other uses.

Haz-Mat Equipment Gone are the days when members of Rescue Companies donned butyl rubber suits and operated at "chemical incidents." In 1984, Hazardous Material Co. 1 was organized and charged with the responsibility for the mitigation of all hazardous materials incidents in the City of New York...not an easy task.

Chemical Protective Clothing is but one piece of the specialized equipment carried by Haz-Mat Co. 1.

Fortunately, they are equipped with some of the most sophisticated equipment necessary to perform this function. Chemical Protective Clothing, state-of-the-art metering equipment, leak kits, sampling devices, overpacking equipment and chlorine kits are but a few pieces of equipment carried. Most recently, the Company has acquired a fully portable gas chromatograph/mass spectrometer, which will be extremely helpful in identifying the presence of nerve agents in the air, among its many other unique capabilities. Two apparatus carry this enormous amount of specialized equipment.

When surveying FDNY members regarding some of the most important tools/equipment of the 20th century, the answers were wide and varied. I would be remiss if I didn't mention them: self-contained breathing apparatus (SCBA), handie-talkies, 1 3/4-inch hose, bunker gear, motorized apparatus, tower-ladders, aerials, foam, individual flashlights and facepieces, air struts, air cart, manning levels, battery-operated tools and the search cam.

About the Author...

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section uptown of the fire building will be less congested. This is just the opposite when a one-way avenue has traffic going downtown. The staging location should be designated at an intersection downtown from the fire building. When a high-rise fire is in the middle of a block, the staging area can be at the intersection farthest from the fire building. This will separate staging from the operations at the fire.

An officer or Chief's aide can be put in charge of the staging area until a Battalion Chief can be special-called to the scene to take over staging.

Accountability

A fire chief should have a system of accounting for firefighters operating at a fire. An accountability system is designed to prevent a firefighter from becoming lost during a fire. It also reduces freelancing during a fire. Freelancing is a term used to describe a firefighter wandering around during a fire without supervision. An accountability system tracks or accounts for the activities of firefighters. The accountability system helps control the movements of everyone operating at the incident. However, Chiefs and company officers must understand that accountability cannot be delegated to a "system." Everyone is accountable and everyone at a fire has a responsibility to be accountable.

For example, the Incident Commander ultimately is responsible for the entire fire operations area. However, realistically, the Incident Commander can track only the sector officers. The Chief cannot know the exact position of 100 firefighters. If he attempts this, he will lose control of the fire and there will be no strategy.

The Incident Commander is responsible to know where the sector chiefs under his command are operating. The sector chiefs are accountable for companies in their sector. And the company officer is accountable for the firefighters in the company. And, most importantly, each firefighter is accountable to the officer of the company.

The chief needs all sector chiefs, company officers and firefighters at the scene to ensure accountability and, ultimately, safety. The chief cannot do it alone. The Incident Commander needs the sector chiefs and company officers to share in the accountability process.

FDNY tracking systems--magnetic boards and riding lists--used to assist in accountability at a fire, can help us in the difficult task of fireground accountability. But we must realize that all of us--not the tracking system--create accountability.

When I was promoted to Deputy Chief with several other candidates, FDNY's Chief of Department gave the group of us a pep talk before the ceremony. He told us when he arrived at the scene of one of my fires and assumed command, he expected me to know the names of the Battalion Chiefs under my command at the fire, their Battalion numbers and location of the sectors to which I assigned them to operate. He further stated that when I, as a Deputy, assumed command from a Battalion Chief, I should expect the Battalion Chief to tell me the companies operating and the locations where they had been assigned. Additionally, he said all this information should be recorded on the command board set up at the command post when he arrived. This also is expected today.

Size-up from interior and exterior

The Incident Commander of a structure fire should establish a command post in front of the fire building and size up the fire from the outside. There also must be an inside size-up. Size-up of a fire can be accomplished from inside and from outside a burning building. The fire officer in charge of the initial hose-line or the interior search operation often makes an inside size-up. The Incident Commander outside the burning building at the command post will make the outside size-up. This Commander first will request a size-up from the inside officer, then make his analysis of the fire and transmit a radio status report of the operation.

At the initial stage of a fire when flames are confined to one floor, the inside size-up is more accurate and useful than the size-up made from outside the burning building. The fire officer inside the structure is closer to the fire and obviously can see more of it than someone standing outside.

However, when a fire spreads through the roof or involves two or more floors, the outside size-up becomes more accurate than the inside size-up. The fire officer inside the building can see only the fire on one floor. The officer inside cannot see the amount of fire burning above in the roof or on the floor or floors above. From his limited view inside, he may believe that the fire involves only one or two rooms on the burning floor and the blaze can be extinguished quickly, when actually, the entire building is involved in fire above the officer and there is a danger of collapse. Two size-ups--one inside and one outside--increase safety during a fire.

Standard operating procedure

A standard operating procedure provides accountability and control. It is a general plan of who does what and where. It lets companies know where they should be operating and what they should be doing when first arriving at a fire before the chief gets there. In New York City, the standard operating procedure for a working fire at a multiple dwelling involves six companies--four engines and two Ladders and a Battalion Chief.

Upon arrival, even if the chief does not get there, the standard operating procedure calls for the first- and second-arriving Engines to stretch the first attack hose-line to extinguish the fire and the third- and fourth-arriving Engines on the scene to stretch the second hose-line to back up the first line or go to the floor above the fire, to stop vertical fire spread. The first Ladder Company performs vent, search and rescue operations on the fire floor, while the second Ladder performs vent, search and rescue on the floor above. A standard operating procedure may be changed by the Incident Commander.

All incoming companies must report to the Command Post for their assignments.
photo by FDNY Photo Unit

Incident command system

The incident command system now is called an incident management system by the rest of the fire service and the National Fire Academy. Today, the FDNY uses the same incident management system taught at the National Fire Academy. The five management or command functions are command, operations, planning, logistics and finance. They are used only when the Incident Commander decides to use them. At a serious working structural fire--

Garcia and deemed incendiary. The Market long had been the subject of organized crime investigations by both Federal and local law enforcement agencies. The fire, believed to have been started because of the organized crime influence in the Market, became the rallying point for the administration to finally put an end to their grip on the industry. As a result, the administration took over the operation of the Market and enacted laws regarding the regulation of people allowed to work and own a business in the Market.

In 1995 and 1996, two other task forces were formed by the Bureau. The Propane Task Force was prompted by a fire in a storefront on West 37th Street in Manhattan, where firefighters were injured by exploding propane tanks. Pushcart vendors stored these tanks. It is against the law to store propane tanks within a building in the City of New York. The vendors who stored the tanks were arrested by FMs for reckless endangerment. The Propane Task Force then confiscated more than a thousand tanks of propane in raids throughout Manhattan during a six-month period. Arrests for reckless endangerment were made and hundreds of summonses issued.

The second task force was initiated because of a rash of high-intensity stairwell fires in city projects throughout the city. These fires were being set in combustible material--discarded furniture, mattresses, etc., within project stairwells. Using paint for fuel, these fires would flash over. At least four people died in these stairwells. The task force was very successful, making 30 arrests in six months and recommending that the paint be removed from the stairwell walls. A program for removing rubbish from the stairwells was started by the Housing Authority. The problem was abated. SFM Louis F. Garcia coordinated both task forces.

On September 24, 1996, the Hyo Shin Bible Presbyterian Church, 42-15 166th Street, Queens, literally exploded at 0450 hours, taking three homes and approximately 20 cars with it. Then-Assistant Chief Fire Marshal Louis F. Garcia responded to the scene and turned the investigation over to SFM Richard McCahey of the Special Investigations Unit, along with FM Greg Pappa and FM Robert Byrnes. This year-long investigation led to reparation for damages to the church and the FDNY by Con Ed and the arrest of an unlicensed plumber who installed an improper gas fitting. This long-term investigation was successful because the physical, which had taken more than a week under dangerous conditions, was a credit to the expertise of Bureau members.

In April of 1997, Commissioner Thomas Von Essen signed the memorandum of understanding that created the Joint Arson Task Force (JATF). This is a partnership with the NYPD and Alcohol, Tobacco and Firearms to investigate long-term commercial fires and arson-for-profit rings. The task force has been very successful in their mission.

Just two examples of their success include the arrest and conviction of the Giannini crew, an organized crime crew that terrorized Queens for years. The 36 federal indictments for arson, murder and racketeering charges resulted in convictions of all members and the end of the crew. Most of the members of this crew were the sons and nephews of the organized crime figures who had been arrested in the famous Pizza Connection Narcotics Case.

Another example is the 65-count indictment of six members of a Russian organized crime brigade that was handed down in March of 1999. The defendants pled guilty to arson, kidnapping, extortion conspiracy and racketeering, in September of 1999. According to the September 20, 1999, press release of the U.S. Attorney for the Eastern District, the case--which started with an arson fire of a row of stores in Forest Hills--was the first indictment in the country using "RICO" statutes to target Russian organized crime enterprises.

As in the 1996 Hyo Shin Church blast/fire in Queens, Fire Marshals often perform the "physical" in very dangerous conditions.

In April of 1998, leadership in the Bureau changed once again with the promotion of Michael Vecchi to Chief of Staff for Commissioner Von Essen. ACFM Louis F. Garcia was made Acting Chief Fire Marshal and officially was promoted to the rank of Chief Fire Marshal on March 8, 1999. On that same day, SFM Richard McCahey was promoted to the rank of Assistant Chief Fire Marshal. Louis F. Garcia is the 10th Chief Fire Marshal in the history of the Bureau of Fire Investigation.

On September 1, 1998, Fire Commissioner Thomas Von Essen instituted an awards ceremony to recognize the efforts of Fire Marshals and their investigations. On that date, Fire Commissioner Von Essen and Chief Fire Marshal Louis F. Garcia presented the awards to 19 Fire Marshals and Supervising Fire Marshals, as well as members from other law enforcement agencies, who helped the Bureau complete its mission. This award ceremony was a proud day for the Bureau because of the recognition received from the Fire Commissioner and the FDNY.

As we enter the third millennium, the Bureau of Fire Investigation is looking forward to changes in three areas:

Computerization In August of 1998, the BFI put away its typewriters and started using computers to make their reports. The program, called Omniforms, is an interim phase in the goal of full computerization. Under the direction of SFM Christopher Tempro, Executive Officer to the Chief Fire Marshal, early in the year 2000, BFI's wide-area computer network will become a reality. The network will link all Commands to each other and Fire Headquarters for the purpose of sharing information and expanding the investigative database.

When Arson 2000 is finished, we will have a real-time look at the Bureau by computer and all names of people interviewed and arrested will be available for cross-referencing. We believe when completed, this database will be the greatest technological tool made available to the BFI since laboratory identification of flammable liquid. Arson 2000 also will enhance our report-writing abilities, as well as provide management with vital statistical information for strategic planning and analysis. Our computerization project could not become a reality without the cooperation and expertise of FDNY/BICS.

Training In 1999, two classes totaling 75 Fire Marshals went through our BFI training academy. Because of PONSI accreditation, all the candidates received 18 college credits. Under the Director of Training, SFM James Kelty, the course was expanded from nine to 11 weeks and a four-month rotation of candidates through all the BFI bases was added. After rotation, the candidates go back to school for review and discuss their experiences in an effort to clear up any questions on their performance.

The Mentor program also was established. Mentors are Supervising Fire Marshals in each location who pick Field Training Officers (FTO) and guide the practical training of the newly graduated Fire Marshals. Mentors must complete observation reports on each FM at the end of each set of tours, plus a comprehensive progress report at the end of each rotation. Our restructured training program has made the transition from Firefighter to Fire Marshal/Police Officer smoother, as well as fomenting increased performance and professionalism. This is evidenced by reading the reports of the new Marshals, as well as field observations made by management.

Rank Structuring Management in the Bureau, with the support of Commissioner Von Essen, will seek to establish a Base Commanding Officer rank. This rank finally will establish a chain of command with accountability and responsibility distributed to the proper middle managers.

On a personal note as Chief Fire Marshal, I would like to say that I believe the hallmark of the Bureau in the '90s is being recognized by the law enforcement community around the country, as well as our own Department. I am most proud of a record that I wish did not exist: Since 1992, seven of our Brother firefighters have made the Supreme Sacrifice as a result of six incendiary fires. Fire Marshals have made arrests in five of the six cases. One case still is under active investigation. Indeed, for 146 years and into the future, Fire Marshals will seek "Truth and Justice From the Ashes."

About the Authors...

Chief Fire Marshal Louis F. Garcia is a 27-year veteran of the FDNY, 18 years of which have been with the Bureau of Fire Investigation. Before joining BFI, he was a Firefighter in Ladder 102 and Rescue 1. As a Lieutenant, he covered in the South Bronx. He is a recognized expert witness in the cause and origin of fire. He holds an AAS degree in Business Administration from SUNY--Farmingdale.

Assistant Fire Commissioner John Mulligan (retired), a former AP reporter, served 12 years as Assistant Commissioner for Press Relations under five Fire Commissioners from 1978 until 1990.