

# Fire fighting helmets, a protection tradition

For centuries, fire fighters have worn helmets to protect them from heat, cinders and falling objects. Although the shape of most fire helmets has changed little over the years, their composition has evolved from traditional leather to metals including brass, nickel and aluminium, to composite helmets constructed of lightweight polymers and other plastics.

Shortly after the formation of fire wards or brigades in larger American cities, it became clear that specialised clothing and headgear were needed to protect those who were on the front lines. Like military units before them, fire brigades adopted helmets during the mid-18th century.

The first fire cap design is credited to Jacobus Turck, a New York gunsmith, who created the leather stovepipe-shaped hat in New York City around

1740. Turck developed America's first fire hat for the Fire Department of New York (FDNY) in order to distinguish the department from competitors. The form was improved by Matthew DuBois, who included iron wire along the rim to stabilise its shape and provide further heat resistance.

In 1828, Henry T Gratacap, a foreman in the New York City Fire Department, is credited with the creation of the traditional American fire helmet. Gratacap, was among the most well-known early fire-helmet makers. Opening his business in 1836, Gratacap was the main producer of New York City fire hats for the next three decades. He called it the 'New Yorker'. FDNY adopted the helmet in the late 1800s.

The New Yorker helmet along with the eagle and leather ID badges are all part of fire fighter tradition and ▶



*A late 19th/early 20th Century brass  
'Merryweather' fireman's helmet*



*The MSA Gallet F1 XF structural fire helmet*



*Rosenbauer's Heros Xtreme and Heros Smart fire fighting helmets*

► are used to this day in traditional leather fire fighter helmets. These frontspieces generally featured their owner's position, brigade number and unit location. Often stitched from tooled leather pieces, helmet shields also included painted images of hoses, ladders or engines, depending on the unit's assignment.

Other fire hat styles were made from pressed felt, wool or papier-mâché, though these were typically better for identification than protection.

It is possible the idea for the new headgear came from jockeys who wore their caps backward. The helmet had a lengthened rear brim and curved sides. They also included elaborate front-pieces that identified the name of the company. This head

covering provided protection from falling debris and prevented water from running down the firemen's neck. When worn backwards, the lengthened brim helped deflect heat from the face. Not only was it useful on the head but it served other purposes as well. Firemen often used the helmet to break windows or provide ventilation. Trapped fire fighters threw it out of windows or off of roofs to indicate help was needed. Gratacap's helmet has been used for many years.

During the 19th Century, special presentation helmets became popular for retirement or promotion ceremonies. The metal shield fronts of these special helmets were sometimes hand-painted with floral designs and gilded patterns.

Gratacap created one of the most famous presentation helmets for a Sacramento fireman using a silver-and-gold frontispiece inlaid with gemstones; the headgear cost around \$1 350, at a time when most fire helmets were closer to \$4.

Two brothers, Jasper and Henry Cairns, purchased Gratacap's business in 1868 and mounted a leather identification badge to the front of Gratacap's helmet. Those early helmets had an eagle sculpted on the fire helmet as a memorial for a fallen fire fighter in the early 1800s. They later incorporated perforations into the design of their products to provide better ventilation. Renamed Cairns and Brother, the company also created the popular low-crown shape during the 1930s, which removed the shield holder entirely to shorten the cap's peak by two inches. After World War II, chin straps and face visors were added to improve the fire cap's protective capabilities. Most of these newer helmets incorporated synthetic materials and streamlined shapes.

Helmet colours indicated rank or position in a specific brigade: White was reserved for chief engineers, black brims on white caps were worn by fire wardens, red helmets were worn by firemen in hook-and-ladder companies and black hats were donned by members of engine companies.

### 'Leatherhead' helmet

Leatherhead is a term for old style leather helmets used by many fire fighters in North America. Leatherhead is also slang for a fire fighter who uses a leather helmet. The leather helmet is an international symbol of fire fighters dating to the early years of fire fighting. Typically, traditional leather helmets have a brass eagle adornment affixed to the helmet's top front of the helmet to secure a leather shield to the helmet front. Leather helmets have fallen into disuse, only seeing use in some fire departments in North America, such as New York and Houston. Canadian fire departments such as Toronto Fire Services that use the Leatherhead have a beaver in place of the eagle for the brass adornment.



Migeod leather fire helmet with lion finial



Rare fox finial Cairns leather fire helmet



French fire helmet 'Srs. Pompiers de Perpignan'



Aluminium helmet



A Dräger smoke helmet in the German fire service museum



British Airports Authority Fire Service black leather helmet



Rare Merryweather Firemans Helmet 1880



Historical fire fighter helmet of Russia



Vintage black leather Isle of Wight Fire Brigade



Fire Service Cork Leather Helmet Pilkington



Henry Gratacap's 'New Yorker'



Nederland 1975

### Brass eagle and beaver

The eagle's origins can be traced to approximately 1825. An unknown sculptor created a commemorative figure for a volunteer fire fighter's grave. Fire fighters did not wear eagles before that but eagles became associated with fire helmets ever since. The beaver ornament adorning on many Canadian fire fighters' helmets is said to represent fire fighters' relentless hard work, focused mission and undying dedication.

These ornaments protrude from the helmet and can catch on window sashes, wires and other obstacles, frequently leading to damage. As a result, many fire departments provide traditional helmets using modern plastic and composite helmets without eagles or beavers, jokingly referred to as salad bowls, turtle shells and slick tops due to

their streamlined shape. However, several fire fighters and fire departments still retain the leather helmet as a matter of tradition.

### Tyndall's hood

In 1871, British physicist John Tyndall wrote about his new invention, a fireman's respirator, featuring a valve chamber and filter tube. This device used cotton saturated with glycerine, lime and charcoal to filter smoke particles and neutralise carbonic acid. The device was featured in the July 1875 issue of *Manufacturer and Builder*.

### Neally's smoke-excluding mask

George Neally patented a smoke-excluding mask in 1877 that he marketed to fire departments. This device featured a face mask with glass eyepieces and rubber tubes, allowing respiration through a filter carried on the chest.

### Merriman's smoke mask

A Denver fire fighter known as Merriman invented an early hose mask that was featured in the 7 January 1892 issue of *Fireman's Herald*. This respirator featured a tube like that of an elephant trunk connected to an air hose that ran parallel to the fire fighter's water hose.

### Loeb respirator

Bernhard Loeb of Berlin patented a respirator (US patent #533854) in 1895 that featured a triple-chambered canister carried on the waist that contained liquid chemicals, granulated charcoal and wadding. This respirator was used by the Brooklyn Fire Department.

### Dräger smoke helmet

Invented in 1903 by Dräger & Gerling of Lübeck, Germany, the smoke helmet was a fully enclosed metal helmet with glass face mask, ▶

- ▶ featuring two breathing bags covered by a leather flap worn over the chest. This respirator became so critical to mine rescue operations that rescue workers became known as draegermen.

### Napoleonic helmets

Napoleon Bonaparte reordered the various fire fighting organisations in Paris (and later other cities) into a unit of the French Army called the Sapeurs-pompiers. They wore a brass helmet with a high central crest, similar to that worn by dragoon cavalry, with a frontal plate on which a badge representing their city was embossed. This style of helmet was widely copied across Europe and beyond.

### Merryweather helmet

Merryweather helmets were used by British fire brigades from the Victorian era until well into the 20th century. These helmets were modelled on the helmets of the Sapeurs-pompiers, which Captain Sir Eyre Massey Shaw had seen on a visit to Paris and introduced to the Metropolitan Fire Brigade in London in 1868, replacing a black leather helmet. The design was widely copied by other British and British Empire fire services. These helmets were made of brass but those belonging to officers were silver plated. Metal helmets are conductive, a safety hazard as use of electricity became widespread and so a new helmet made from a composite of cork and rubber was introduced in London and elsewhere from 1936.

However, during World War II, military-style steel helmets were adopted, similar to the Brodie helmet used by the British Army, to improve protection during air raids. A composite helmet was reintroduced after the end of the war. Traditional brass helmets remained in service in Queensland, Australia, until 1970.

### Aluminium helmets

Helmets made of aluminium also appeared toward the end of the 19th Century but were much rarer because of the cost of the material. Some departments, such

as the Buffalo Fire Department for example, used aluminium helmets up to the mid-1980s.

### German DIN fire helmet

In Germany, many fire brigades still use the old German DIN fire helmet. Early on, this helmet was simply an aluminium alloy version of the M1943 Stahlhelm used by the Wehrmacht, standardised in 1956 and normed in 1964 by DIN 14940. The material was AL-CU-MG, normed by DIN 1725. At about 800g, it was lighter than most fire fighting helmets.

The colour was Wehrmacht black in the beginning or red in Bavaria. The norming process of the 1960s changed colour to a fluorescent lime yellow. This helmet uses a white reflecting stripe and black leather neck protection. Most fire brigades use this helmet with an easily mountable visor.

The German DIN fire helmet does not correspond to the currently valid European EN 443 standard for fire helmets due to its conductivity. German fire brigades are allowed to use existing aluminium DIN fire helmets but if new helmets are necessary, fire fighters must purchase either composite or a newly developed version of the old helmet with EN 443-compatible coating. At about 900g, coated aluminium helmets are still relatively lightweight. Some manufacturers currently produce fire helmets constructed of glass fibre reinforced plastic, replicating the look of old German DIN fire helmets. However, it is not uncommon that fire brigades move to modern helmets.

### Modern composite helmets

#### F1 helmet

The F1 helmet is a modern fire fighting helmet made in France by Gallet, a subsidiary of MSA Safety. In service since 1985, the F1 helmet provides protection against impact, fire and electricity, fulfilling EN 443 European standard.

The F1 was an answer to requirements of the Paris Fire Brigade for replacement of the previous helmet (Casque modele 1933 was similar to the Merryweather)

that dated to 1933; these helmets provided insufficient protection for the face and back of the head and were not thermally insulated. The F1 helmet is handmade using synthetic materials often covered with galvanised nickel. These helmets can accommodate communication systems and other accessories.

The F1 has been used by the Paris Fire Brigade since August 1985 and has been widely adopted by all French fire services, gaining export success in more than 85 countries including fire departments in Switzerland, the United Kingdom, Hong Kong, Canada and Japan (notably in Tokyo).

### Modern structural helmet

Modern structural helmets (that is, those intended for structure fires) are made of thermoplastic or composite materials. The rear brim is longer than the front brim; a face shield(s) is usually attached to the front. This helmet type is worn in the United States and Canada as well as the United Kingdom, Australia and parts of Asia (notably Hong Kong, Macau, Taiwan, and Guangzhou). Newer 'Metro' helmets, the name given by several leading helmet manufacturers, with smaller brims and rounded edges are also much lighter than both leather and composite traditional helmets.

"Although safety standards have dramatically changed the interior, the exterior of a leather helmet manufactured today as well as the classically shaped plastic versions, would no doubt be recognisable by Henry Gratacap or the original Cairns brothers. In a world where change seems to be the only constant, that the basic design of the fire helmet could remain intact for 177 years is nothing short of amazing, said Gary R Ryman, author of the book 'Mayday! Firefighter down'.

There are numerous manufacturers of state-of-the-art fire fighting helmets today, which include high technology in order to keep fire fighters safe, while integrating communication systems and self-contained breathing apparatus in a comfortable fit. The choice is yours! 