

Ornamental Blacksmiths



Occupational Brief Title Codes:

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Work Classification Based Related

D.O.T. Occupations:

- Drophammer Operators
- Fittings Finishers
- Metal Fabricators
- Salvage Workers
- Spring-Manufacturing Set-Up Technicians

Interests Based Related

G.O.E. Occupations:

- Automobile-Body Customizers
- Millwrights
- Sheet-Metal Workers
- Structural-Steel Workers
- Welder-Assemblers

Skills Based Related

O*NET Occupations:

- Forging Machine Setters, Operators, and Tenders, Metal and Plastic
- Metal Molding, Coremaking, and Casting Machine Operators and Tenders
- Model Makers, Metal and Plastic
- Welder-Fitters

Noteworthy Quote:

“The rewards of being a blacksmith in the twenty-first century are both immediate and tangible. Working with hands, brain, and body, a smith creates new form from a difficult but long-lasting material, steel. There is tremendous satisfaction to be had by seeing at the end of each day...just exactly what was made while earning a good living doing so.”

—Scott Lankton, Board Member, Artist-Blacksmith’s Association of North America, Ann Arbor, Michigan

Ornamental blacksmiths (or-na`men-tal`black-smiths) make handcrafted ornamental products of wrought iron and steel, such as ornamental gates, chandeliers, fireplace screens, door hardware, and other decorative objects.

For centuries the art and craft of blacksmithing has been handed down from generation to generation. Even today, buildings graced with masterpieces such as iron balconies, grilles, and gates, which look more like lace than metal, stand as enduring testimony to the art of blacksmiths. The ancient craft of blacksmithing has undergone a rebirth. Ornamental ironwork is in great demand by both private individuals and organizations who are restoring houses, buildings, and historic structures of the Victorian period as well as other eras.

It is important to understand that wrought iron craft skills differ from those for producing cast iron. The word wrought means worked. Wrought iron or steel can be “worked” on the anvil by hammering while it is hot, while it is cooling, and sometimes when it is cold. It is possible to do this because wrought iron is almost pure iron with hardly any carbon content. When the iron is heated, it can be drawn out, stretched, twisted, bent, hammered thin, welded, and shaped to new forms. True wrought iron, however, is no longer made, except in Europe. Most smiths today work in mild steel, a low carbon steel containing .05 to .20 percent carbon, that is soft and easily worked.

Cast iron, on the other hand, is in a family of iron alloys containing 1.8 to 4.5 percent carbon. These metals are usually “cast.” That is, workers pour the hot molten metal into a mold or container where it hardens to that shape. Most cast iron products are made in production mills or foundries that turn out thousands of identical shapes. This brief deals with blacksmith artisans who practice metal-working as an art, craft, hobby, profession, and pastime. Each object made by ornamental blacksmiths is individually handcrafted.

Work Performed

Ornamental blacksmiths use the same basic tools and equipment as those of the village blacksmith of years ago. The shop has a forge, a tank for water, an anvil, a vise, and an array of hammers, tongs, swages, and other tools for working and shaping the metal.

The anvil is a heavy block of steel or iron used as a work surface for hammering the metal. A forge holds the fire for heating the metal. The fire can be made to burn briskly by means of hand crank, blower, or electric blower. Alongside the forge is a water tank for cooling parts.

When they have a job to do, blacksmiths first look at the sketches, diagrams, blue prints, and artistic or architectural drawings submitted by an architect, contractor, or client. Many blacksmiths create their own designs. From these specifications, they plan the layout and assembly of the project.

Most blacksmiths buy the raw stock in the shape of steel bars or rods, and sheets or plates of various thicknesses. Some incorporate other metals, such as brass, copper, bronze, and even titanium, into the product.

To begin, blacksmiths lay out the reference points on the stock and plan the sequence of operations. Competent blacksmiths carefully think out their strategy in advance to prevent false starts or operations that have to be repeated.

Skill is required to forge and shape two or more pieces of a pattern exactly the same. Any blow on one face of the iron means that the anvil underneath is exerting an almost equal force on the opposite face, so that one blow may wipe out the effects of another.

Blacksmiths cut stock to size and work with each piece to shape it. Iron and mild steel can be worked when cold or hot. Different processes call for different degrees of heat.

Blacksmiths heat pieces in the forge to working temperature, which they judge by the color of the metal as it heats: blood red, dark red, light red, orange, yellow, or white. While the metal is hot, blacksmiths take it to the anvil and bend, twist, stretch, and hammer the pieces to specified shape.

The more the metal is worked, the more refined it becomes. It may take several heatings and repeated working on the anvil to bring a part to the desired shape and dimensions.

Ornamental blacksmiths have several hammers such as a sledge hammer for heavy work, hammers for texture, and a tool used to form sharp shoulders and for pulling material between narrow spaces. For some work, blacksmiths may use a mechanical or a pneumatic hammer, which has more power. They use a group of tools to make forms such as scrolls, curves, leaves, spikes, and so forth. Different kinds of tongs are used to grip different shapes of bars.

Three other necessary tools are the top, bottom, and spring fullers. These are useful in drawing out metal to lengthen it or to make grooves, impressions, tenons, and the like. Top and bottom swages help produce bars of desired profiles. Cutting tools include hot and cold chisels. A cone mandrel fits into the hardy hole and is useful for working on anything of circular form that can be beaten against it.

Flatters are used for finishing flat areas. Blacksmiths also have punches of round, flat, square, and hammer type. They use a heading tool to make bolt heads or rivets and to complete the first steps of flower work.

Ornamental blacksmiths hammer flat sheets of metal to form ornamental imprints such as flowers or leaves. One method of forming is called repoussé. This consists of pounding out thin plates or sheets of iron, copper, aluminum, tin, or stainless steel from the rear, and then later on chasing the front surface. This produces an embossed (raised) design of leaves, flowers, fruits, animals, or other motifs.

Forge or hammer welding is a method for fastening the pieces together to make the final assembly. Two or more parts are equally heated and hammered together to form a weld. There are several kinds of welds, the most common being the lap weld or two pieces joined end to end. A fagot is a number of members joined together. Others are the

basket, the right angle, the T, the cleft or fork, the split, and the butt weld.

Another means of joining parts is with a collar. Blacksmiths wrap a thin piece of hot iron around two members and hammer down the overlapping ends. In tenoning, blacksmiths may pierce a heated bar with a punch or chisel and slide another bar or rod through the opening. They may also rivet an assembly.

Ornamental blacksmiths apply a finish on the completed piece to preserve it and to prevent rust. The smiths scrape or sand blast the surface until they remove all scale and foreign substances. Numerous wax, oil, or polyurethane finishes allow for the addition of colors and highlights.

Some ornamental blacksmiths install their work in the building or on the premises of the customer. To do this, they mount any stays, brackets, supports, or anchors required to fasten or install the work.

Working Conditions

Most ornamental blacksmiths have their own smithy or shop. They usually work alone or with a helper. Ornamental ironworking is hard, hot, sweaty work. Blacksmiths wear protective clothing, safety glasses, ear protection, steel-toed shoes, and welding masks to avoid injury, burns, or damage to their eyes. Installing pieces may require working outdoors, sometimes on a scaffold or platform high off the ground, or in a variety of awkward positions while bending or stooping.

Hours and Earnings

Since many ornamental blacksmiths are self-employed, their hours are not regular nor certain. When they get an assignment or job, they may agree to finish it within a stated time and work whatever hours are required. Many of these workers also have other jobs and do their blacksmithing on weekends or after their regular work hours.

The income of ornamental blacksmiths comes from fees they charge clients. They may set a price for the finished project or charge so much an hour. Fees depend on the size and complexity of the project and the materials. Exact earnings cover a wide range. Many of these workers practice their craft only part-time, and their earnings are not steady. Some set their earnings by contract. Earnings also vary by region and the kind of clients they have. The earnings of successful blacksmiths range from just enough to cover expenses and pay a living wage to the large earnings of those who are highly recognized or specialize in restoration work.

According to a professor who heads the graduate program in blacksmithing at Southern Illinois University, the going rate for accomplished self-employed blacksmiths is about \$50 an hour. Average yearly earnings for

full-time blacksmiths generally fall between \$15,000 and \$60,000 a year. Some earn \$75,000 or more a year. A very few of these workers specialize in restoration work for museums or the government. Top earnings for these workers may reach \$145,000 or more a year.

Self-employed ornamental blacksmiths must reinvest part of their earnings in the purchase of materials and the maintenance of their shop. As independent business owners, they also have no employer to give them paid holidays, medical insurance, or other benefits. They must pay for these extras themselves.

Education and Training

Blacksmithing, like many other crafts, requires experience and ability. The old time blacksmiths passed on their know-how either to their sons or to apprentices in the trade. Apprentices then went on, in turn, to instruct others. Today, ornamental blacksmithing, like other businesses, is becoming ever more complex. Formal schooling is advisable, and those who want to forge a career in ornamental blacksmithing can learn the craft in many programs offered nationwide.

In the United States, there are more than 50 colleges, craft centers, and schools offering courses in blacksmithing. The Appalachian Center for Crafts at Tennessee Technological University, for example, has an undergraduate program in fine arts, as well as non-degree certificate enrollment, in metals and blacksmithing. Southern Illinois University has a master's degree program in fine arts for blacksmithing. Other courses range from full semesters to programs of study scheduled for evenings, weekends, or summers. Some facilities offer two-day workshops, on a regular basis, for beginning, intermediate, and advanced levels. Instructional videos are also available.

Most of these programs have limited enrollments, which guarantee one-on-one instruction. Classes take place in blacksmithing laboratories equipped with several forges and anvil stations. Courses cover hands-on training in basic and advanced blacksmithing, forging techniques, scrollwork, wrought iron design, techniques of metal forming, toolmaking, and finishing techniques. Students learn about steel strengths, design stresses, drawing and reading blueprints, elements of design, and the applications of hydraulic power, footpounds of torque, horse power, PSIs (pounds per square inch), AC-DC currents, volts, amps, and BTUs (british thermal units).

Many professional and trade organizations also offer educational resources. The Artist-Blacksmith's Association of North America, Inc. (ABANA) and the National Ornamental & Miscellaneous Metals Association (NOMMA), for instance, offer educational programs and compile informational resources that provide avenues for learning about the art and craft of blacksmithing at all

levels of experience. Seminars and workshops are ongoing nationwide. Demonstrations and lectures bring participants up-to-date on new products and techniques.

High school students planning to be blacksmiths should take courses in industrial arts, mathematics, physics, chemistry, art, English, and business and accounting. Those who plan to attend a college program must meet the entrance requirements. Other useful subjects include blueprint reading, shop mathematics, mechanical drawing, mechanics, design, engineering, electricity, and metallurgy.

Professional Societies

The principal organization for ornamental blacksmiths is the Artist-Blacksmith's Association of North America, Inc. (ABANA). It consists of over 4,500 members who are professional blacksmiths, artists, and others with an interest in blacksmithing techniques. Other organizations include the National Blacksmiths/Welders Association (NBWA) and the National Ornamental and Miscellaneous Metals Association (NOMMA).

ABANA, NBWA, and NOMMA are all dedicated to preserving, promoting, and sharing technical skills and aesthetic excellence in blacksmithing. They offer their members workshops, exhibitions, technical publications, conferences, and classifieds. They also make videotapes and other resources available to their members.

Personal Qualifications

Ornamental blacksmiths must have the physical ability to perform the tasks of blacksmithing, including good eyesight, hand-eye coordination, and manual dexterity. A keen sense of design and artistry are also important. Accuracy and foresight are essential for planning and producing wrought iron objects to specifications. They should be able to concentrate on detailed work for long periods.

Blacksmiths should have good decision-making skills and the creativity to solve design, structure, and other business problems. Self-discipline, motivation, and initiative are necessary for all people who are self-employed. These workers must have the ability to deal with customers and to meet the obligations of running a business. They should be flexible, good-natured, and able to work well alone as well as with others.

Occupations can be adapted for workers with disabilities. Persons should contact their school or employment counselors, their state office of vocational rehabilitation, or their state department of labor to explore fully their individual needs and requirements as well as the requirements of the occupation.

Where Employed

Blacksmiths work throughout the United States. Most are self-employed. Although there are thousands of ornamental blacksmiths producing hand-wrought metal

items, only about 10 percent of them are employed full-time. Many of the others are part-time workers with regular jobs elsewhere.

Some ornamental blacksmiths specialize in certain kinds of ironwork. They may, for instance produce items with a western, camping, or cowboy motif. Others may design and craft ironwork gifts such as candle holders and home interior products. Some hand-forge blacksmith tools such as hammers, bending jigs, and scroll forms. A small number of ornamental blacksmiths specialize in restoration work for museums or the government.

Employment Outlook

Although wrought metalwork continues to grow in popularity, the market for handcrafted work is still limited. Much ironwork, such as fences, lamp posts, and gates, are mass-produced in mills or foundries. For this reason, full-time employment offering a living wage is seldom a realistic goal. Still, some men and women can earn a living with a hammer and anvil. Others enjoy it as a hobby that offers a satisfying outlet for artistic expression. As long as architectural and structural materials, and other equipment and machines are made of iron and steel, the skill of the blacksmith will continue to be needed to create, repair, and make replacement parts for them.

Entry Methods

Learning the craft of blacksmithing usually takes three to five years. Blacksmiths who wish to set up their own forge or blacksmithing shop must have capital (money). Schools of blacksmithing or ornamental ironwork often have contact information for individuals offering employment or work assignments. Blacksmith, welder, and other ironworker associations also offer members leads to individuals or agencies looking for skilled blacksmiths.

To generate interest and clientele, ornamental blacksmiths should display their work. They need to craft a group of wrought iron items and exhibit them at craft fairs, workshops, conferences, and other gatherings where the public comes to look and buy. Accomplished blacksmiths should get in touch with architects, contractors, building designers, government agencies that restore historic buildings, and others who may need the services of a blacksmith for restoration or preservation purposes.

Advancement

Skilled ornamental blacksmiths may become teachers at a school of blacksmithing. However, other advancement opportunities primarily take the form of increased earnings and prestige. Part-time workers may build up a full-time business. Talented individuals may branch out into other

ornamental design work and produce objects such as fire screens, sculptures, statuary, jewelry, or religious objects.

For Further Research

Artist-Blacksmith's Association of North America, Inc., P.O. Box 816, Farmington, GA 30638-0816. Web site: www.abana.org

National Blacksmith and Welders Association, 272 Third Avenue, S.E., Halliday, ND 58636-3604. Web site: www.horseshoes.com/assoc/nationalblacksmiths/nbwa

National Ornamental and Miscellaneous Metals Association, 1535 Pennsylvania Avenue, McDonough, GA 30253. Web site: www.nomma.org

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