Chronicle Guidance Publications

Firearms Industry Workers

Occupational Brief Title Codes:
- D.O.T.: 736.
- G.O.E.: 06.04
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Occupational Subtitles:
- Assemblers
- Assembly Inspectors
- Barrel and Receiver Aligners
- Control Shooters
- Gunsmiths
- Machine Operators
- Sight Mounters
- Subassemblers

Work Classification Based Related D.O.T. Occupations:
- Live Ammunition Inspectors
- Metal Fabricator Helpers
- Solderers

Interests Based Related G.O.E. Occupations:
- Bench Workers
- Production-Machine Tenders
- Punch-Press Operators

Skills Based Related O*NET Occupations:
- Buffing and Polishing Set-Up Operators
- Casting Machine Set-Up Operators

Noteworthy Quote:

"To the design engineer, firearms offer one of the most demanding design challenges of any mechanical system. Dealing with high pressures, high temperatures, corrosive and explosive propellant gases, gyroscopic stability, and harsh environmental conditions, most principles of mechanical engineering are pushed to their limit. For the machinist, opportunities exist to work with the latest Computer Numerical Controlled machine tools in an industry uncommonly producing a high volume, high value product."
–George Kontis, Barrett Firearms Manufacturing, Inc., Murfreesboro, TN

Firearms industry workers (`fire-arms `in-dus-try `work-ers) operate machines or use tools and equipment to build and repair firearms such as rifles, shotguns, revolvers, and pistols for both military and sports use.

The invention of gunpowder changed the ways of war. In the 1300's, the armies of Europe began to use cannons instead of catapults. Foot soldiers used muskets instead or swords. These crude guns were the first of a long line of weapons that led to the guided missiles and rocket launchers of today.

Early American settlers used their fowling pieces to shoot game. The Kentucky rifle gets its name from the fact that the interior of the barrel is "rifled" or cut with spiraling grooves that put a spin on the bullet and improve the accuracy of the firearm. Texas Rangers subdued outlaws with the six-shooter, a revolver developed by Samuel Colt to fire six cartridges before it needed reloading. Today, firearms are very popular in America. Millions of hunters, sports enthusiasts, gun collectors, and law enforcement agents use firearms.

Work Performed

Both semiskilled and skilled workers are employed in the firearms industry. They include machine operators, assemblers, inspectors, engineers, managers, and test-fire shooters, along with others. These workers design, make, assemble, and test rifles, shotguns, carbines, revolvers, and pistols.

The making of a firearm begins with the product design. Drafters, designers, and engineers create new firearms, improve old models, and design the tools to manufacture them.

Model shops make the first models called prototypes. After a successful testing of a prototype, the factory then carries out a pilot run. This is a first production run to test the tooling, machinery, and gauging selected. If a pilot run proves that the specifications, drawings, methods, and so forth are satisfactory, regular production of the model can begin.

Firearms consist of three main parts: the barrel, the stock, and the action or firing mechanism. ***Machine operators*** in the firearms industry tend machines that cut, grind, drill, shave, bore, smooth, or carve metal or wood. They produce gun parts such as barrels, triggers, hammers, firing pins, safety levers, slide locks, sights, and stocks.

In rifling, for instance, operators run a machine called a gun-drill that drills, reams, and cuts spiral grooves in the bore of the gun barrel. They fasten a cutting tool such as a reamer, drill, or rifling tool to the machine. They place a gun barrel on the holding fixture. When they activate the machine, the cutting tool makes the bore and the grooves, called rifling. At intervals during machine runs, operators take a part from the machine and measure it with gauges to make sure the machine is producing parts to exact dimensions.

Firearms assemblers and ***subassemblers*** put the finished parts together. Workers check parts for nicks, burrs, machine marks, and accuracy. They check the dimensions of parts and then screw, pin, and bolt parts together. They test the action of the firearms to detect malfunctions. If necessary, assemblers take the

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guns apart and file, scrape, and ream the parts to fit. They may test the firearms. They may fasten parts in a vise and file off excess metal and surface blemishes. They may also rub parts with emery cloth to give them a satin finish.

Barrel and receiver aligners assemble and align rifle barrels and receivers. They put a barrel in a vise and screw the receiver on the barrel. After gauging and marking spots on the barrel where metal must be removed, they scrape metal from the barrel or shape the chamber to make the parts fit. They mount sighting bars at each end of the barrel, sight between the bars, and twist the receiver to align the bars. They tighten the receiver and barrel to adjust the alignment according to a dial gauge reading.

Sight mounters attach and adjust sights to shotguns and rifles. They mark the position for mounting holes, drill holes in the barrel, and screw the sight on the barrel. Sight mounters position the gun in a holding fixture, sight through the bore, and move the fixture to align the gun with the target. They turn set screws on the sight mount to align the telescopic sight.

Workers in quality control check machined parts for tolerance specifications. ***Assembly inspectors*** examine and test assembled firearms for such things as cocking and trigger action. They test shotgun and rifle barrels for straightness. They look for flaws in the finish on wood and metal surfaces, and check the joints (where metal and wood parts meet) for fit. Inspectors keep records and tag defective firearms.

Control or ***test shooters*** check the loading, firing, and ejection parts and the accuracy of bore and sights. After aiming and firing a series of shots at a target, they examine the pattern of shots on the target. They adjust and align the sights to correct any inaccuracies. They also look at the dent in the empty cartridge primer after firing to see if the firing pin is faulty. They record defects or flaws on the target or tag and route the gun for repairs or correction. They test-fire guns for overload pressure. They use special proof round ammunition that, when fired, creates higher pressure than that of standard ammunition. They look at firearms and spent cartridges for signs of defects. After proof tests they measure the chambers and bores for deformation.

Gunsmiths produce and assemble guns according to blueprints or to special specifications. Usually the parts are made by manufacturers, but for special guns, gunsmiths may make the entire piece. Private gunsmiths have a great deal of responsibility to maintain quality in their work as well as to keep within the parameters of legal responsibility as regulated by the Bureau of Alcohol, Tobacco, and Firearms.

These specialists take the stock of the gun and attach the barrel and the action to it. One method of fitting pieces together is glass bedding. Gunsmiths pour a liquid compound such as fiberglass into the hollow part of the stock. They then attach the barrel and the action and allow the compound to harden. This makes a tight fit. Gunsmiths also attach and align special parts such as metallic or optical sights, pistol grips, and decorative pieces.

Gunsmiths may carve and finish gunstocks to customer specifications calling for outdoor scenes, engravings, or a checkered or diamond pattern to improve the grip. They may finish and polish the stock with lacquer, oils, resins, and other finishing materials. Gunsmiths also protect the metal parts of weapons with bluing, which gives the metal a rust-resistant surface. In other custom work on firearms gunsmiths may rebore rifle barrels to enlarge the caliber and cut new rifling into the barrels. They may repair or restore antique guns and make replacement parts for worn or broken pieces. Gunsmiths also test-fire the pieces they repair.

Working Conditions

In the firearms industry, machine operators stand most of the day. Safety shields on machines prevent accidents. Workers wear safety glasses and follow safety rules. Firing ranges are noisy. Testers and workers near test firing ranges wear ear protectors. Paint and shellac workers wear masks to avoid breathing the fumes.

Hours and Earnings

Firearms industry workers generally work 40-hours a week, however, workers often work overtime to meet production needs. Some plants operate more than one shift, requiring some workers to work second or third shifts.

Wages vary with the skill and experience of the worker, as well as the employer and geographic location. Some workers earn incentive wages. That is, they get paid by how much they produce, rather than the number of hours they work. According to the Bureau of Labor Statistics, in 2003, wages for production workers in the firearms industry averaged around $728.53 a week.

Gunsmiths in business for themselves charge customers according to the work required on an order. Net earnings may average from $12.00 to $20.00 an hour. Successful gunsmiths may earn much more.

Employer benefits include paid vacations, holidays, and sick leave. Most firms have life and medical insurance, and pension plans. Employers may also have bonus plans to reward workers for extra production or useful suggestions. Self-employed gunsmiths, however, must obtain their own benefits, in addition to costs for machines, equipment, and parts.

Education and Training

Usually, newly hired machine operators and other production workers begin in basic jobs. Beginners watch and help experienced workers. In many training programs

workers may attend classes to learn skills such as blueprint reading, gauging, and measuring.

Some workers learn the craft of gunsmithing through an apprenticeship. An apprenticeship is a formal contract between a worker and an employer or a union. The workers agree to work for a stated period of time such as three or four years, and the employer or the union teaches them the craft.

Gunsmithing programs are available at community colleges or technical schools at about ten locations in the United States. Some of these schools have a two-year degree program, and others award a diploma after completion of 2,500 to 2,800 hours of classes and workshops. Subjects taught in these schools include algebra, trigonometry, metallurgy, drafting, and machining. In shop classes students learn welding, brazing, soldering, barrel fitting, custom stock making, and restoration techniques.

Useful high school subjects are mathematics, computer science, mechanical drawing, blueprint reading, metal shop, wood shop, and machine shop. A knowledge of the practical applications of mathematics such as decimals, fractions, and the metric system is important.

Unions and Professional Societies

Many of these workers belong to a union. The International Association of Machinists and Aerospace Workers represents the interests of machine operators.

The Sporting Arms and Ammunitions Manufacturers' Institute is the trade association of most producers of sporting firearms and ammunition. It is active in matters relating to voluntary industry standards and product safety.

The National Shooting Sports Foundation consists of 1,200 manufacturers, dealers, distributors, and sales representatives of hunting and shooting equipment and accessories.

The American Custom Gunmakers Guild has a membership of stockmakers, metalsmiths, and engravers who exchange views, ideas, and techniques and who promote awareness of custom gun making as an art form.

The National Rifle Association of America is a national organization that promotes the use of firearms for sports.

Personal Qualifications

Firearms industry workers must be precise and exact in their work. They should be able to work well with others in a team effort. Machine operators should be able to tolerate the repetitive nature of the tasks. Attention to detail is important in custom work.

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

According to the Bureau of Labor Statistics, roughly 21,000 production workers are employed in small arms, ammunition, and other ordnance and accessories manufacturing. There are also about 2,500 skilled independent gunsmiths working throughout the United States.

More than twenty-seven firearms manufacturing firms operate throughout the United States. About ten are in states on the East Coast. Others are in northern and western states. Two are located in the South in Arkansas and Tennessee.

Employment Outlook

The small arms industry, including long guns (rifles and shotguns) and handguns, is not regarded as a real growth industry. The market has been fairly stable, however, and competition exists among manufacturers. Most openings will arise from replacement needs, as experienced firearms industry workers leave the occupation or retire.

Entry Methods

Students may be able to get a part-time or summer job in a sporting goods store or gunsmith shop. They may learn about firearms through classes offered by the National Rifle Association, the YMCA, or local hunting clubs.

Employers prefer to hire those who have as much schooling as a job requires. Companies may give aptitude tests to screen applicants. Most firms also check references closely.

Job seekers may get help from a state employment office or from a local union agent. In localities with a firearms industry the newspapers may carry want ads for workers. Persons interested in employment in the firearms industry may also look to companies that deal in accessories, ammunition, components, reloading equipment, or optics.

The Yellow Pages of phone books list gunsmiths and firms that make firearms under "Guns and Gunsmiths." Another excellent source is Gun Digest published annually by DBI Books, Inc.

Advancement

Workers with the skills, the drive, and the ability to direct others may become supervisors. Production workers may become inspectors or supervisors. With further instruction and training, skilled machine workers may become programmers of computer numerical-control machines. They may also go into technical work such as tool-and-die design. Some workers with experience and education may become custom gunsmiths. In time they may open their own shop.

Persons interested in firearms or metalworking might explore ballistics work in crime laboratories. Ballistics is the study of the firing processes of weapons and of the characteristics of the projectiles or bullets.

For Further Research

American Custom Gunmakers Guild, 22 Vista View Lane, Cody, WY 82414-9606. Web site: www.acgg.org

National Shooting Sports Foundation, Flintlock Ridge Office Center, 11 Mile Hill Road, Newtown, CT 06470-2359. Web site: www.nssf.org

Sporting Arms and Ammunition Manufacturers' Institute, Inc., 11 Mile Hill Road, Newtown, CT 06470. Web site: www.saami.org

Acknowledgments

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