

## SIGNIFICANT POINTS

- Employment is expected to decline in the face of increasing computerization, growing imports of some printed materials, and the expanding use of the Internet.
- Computerization has eliminated many prepress and production jobs, but has also provided new job opportunities for digital typesetters, desktop publishers, and other computer-related occupations.
- Though employment is concentrated in firms that employ 50 or more workers, most firms are small: 7 out of 10 employ fewer than 10 people.

### Nature of the Industry

The printing industry prints products ranging from newspapers, magazines, and books to brochures, labels, newsletters, postcards, memo pads, business order forms, checks, maps, T-shirts, and packaging. The industry also consists of establishments that provide related services to printers, such as embossing, binding, finishing, and prepress services. Commercial lithographic printing establishments, which print a wide variety of products including newspaper inserts, catalogs, pamphlets, and advertisements, make up the largest segment of the industry, accounting for about 31 percent of employment and about 39 percent of total establishments. Establishments offering primarily digital printing, which is the most technologically advanced method of printing constitutes the smallest segment of the industry—about 4 percent of total employment. Much of the work of this segment is characterized by low volume, often done by very small shops. Another segment of the printing industry is quick printing. Quick printing establishments generally provide short-run printing and copying with fast turnaround times.

Printing is a large industry composed of many shops that vary in size. About 7 of every 10 printing shops employ 10 or fewer workers. (See chart.)

**About two-thirds of establishments in printing employ fewer than 10 workers.**



There are five printing methods that use plates or some other form of image carrier—lithography, flexography, gravure, screen printing, and letterpress. Plateless or nonimpact processes, such as electronic, electrostatic, or inkjet or “toner-based” printing, are used mainly for copying, duplicating, and specialty printing, and is being used more and more throughout the industry.

Lithography, which uses the basic principle that water repels oil, is the most widely used printing process in the industry. Lithography lends itself to computer composition and the economical use of color, accounting for its dominance. Flexography produces vibrant colors with little ruboff, qualities valued for newspapers, directories, and books, which are its biggest markets. Gravure’s high-quality reproduction, flexible pagination and formats, and consistent print quality have won it a significant share of packaging and product printing and a growing share of periodical printing. Screen printing prints designs on clothes and other fabric items, such as caps or napkins. Where letterpress is still used, it prints images from the raised surfaces on which ink sits; the sunken surfaces do not show up on the paper. The raised surfaces are generated by means of casting, acid etching, or photoemulsion.

The printing industry, like many other industries, continues to undergo technological changes, as computers and technology alter the manner in which work is performed. Many of the processes that were once done by hand are becoming more automated. Technology’s influence can be seen in all three stages of printing: *Prepress*, preparation of materials for printing; *press* or *output*, the actual printing process; and *postpress* or *finishing*, the folding, binding, and trimming of printed sheets into final form. The most notable changes have occurred in the prepress stage. Instead of cutting and pasting articles by hand, workers now produce entire publications on a computer, complete with artwork and graphics. Columns can be displayed and arranged on the computer screen exactly as they will appear in print, and then printed. Nearly all prepress work is becoming computerized, and prepress workers need more training in computers and graphic communications software. Technology has also affected the printing process. In response to environmental concerns, printers increasingly use alcohol-free solutions, water-based inks, and recycled paper.

Most commercial printers now do some form of digital printing. Printing processes today use scanners and digital cameras to input images and computers to manipulate and format the

graphic images prior to printing. Digital printing also is transforming prepress operations as well as the printing process. It eliminates much of the lengthy process in transferring print files to the printing press by directly transferring digital files to an electronically driven output device bypassing traditional prepress operations.

### Working Conditions

The average nonsupervisory worker in the printing and related support activities industry worked 38.4 hours per week in 2004, compared with 40.8 hours per week across all manufacturing industries. Workers in the industry generally put in an 8-hour day, but overtime is often required to meet production deadlines. Larger companies tend to have shift work. There is a fair amount of variability with shift schedules and overtime, which are based largely on seniority.

Working conditions vary by occupation. For example, press operators who work with large web presses or pieces of bindery equipment wear ear protectors. On the other hand, prepress technicians and related workers usually work in quiet, clean, air-conditioned offices. Fortunately, with the advanced technology in machinery, there is not as much strain on the eyes as in the past. Most printing work involves dealing with fine detail, which can be tiring both mentally and physically.

Even with more safety-enhanced machinery, some workers still are subject to occupational hazards. Platemakers, for example, may work with toxic chemicals that can cause skin irritations, and press operators work with rapidly moving machinery that can cause injuries. In recent years, working conditions have become less hazardous as the industry has become more automated. Also, companies are using fewer chemicals and solutions than in the past and are experiencing fewer equipment-related accidents.

### Employment

In 2004, the printing industry had about 665,000 wage and salary jobs, in addition to 33,000 self-employed and unpaid family workers, ranking it among the larger manufacturing industries. About 9 percent of wage and salary jobs were in establishments employing fewer than 10 workers. (See chart.) About 31 percent were in the largest industry sector—commercial lithographic printing (table 1). Printing plants are widely dispersed throughout the country; however, more specialized types of printing tend to be regionally concentrated. For example, the printing of financial documents is concentrated in New York City.

**Table 1. Percent distribution of establishments and wage and salary employment in printing by detailed industry, 2004**

| Industry segment                                      | Establishments | Employment |
|---|----------------|------------|
| <b>Total</b> .....                                    | 100.0          | 100.0      |
| Commercial lithographic printing .....                | 31.3           | 39.5       |
| Commercial gravure printing .....                     | 1.0            | 2.6        |
| Commercial flexographic printing .....                | 3.9            | 6.2        |
| Commercial screen printing .....                      | 12.7           | 9.9        |
| Quick printing .....                                  | 26.3           | 10.5       |
| Digital printing .....                                | 3.7            | 3.0        |
| Manifold business forms printing .....                | 2.4            | 6.0        |
| Books printing .....                                  | 1.5            | 5.0        |
| Blankbook and looseleaf binder<br>manufacturing ..... | 0.6            | 1.6        |
| Other commercial printing .....                       | 8.6            | 7.1        |
| Trade binding and related work .....                  | 2.7            | 3.7        |
| Prepress services .....                               | 5.2            | 4.8        |

### Occupations in the Industry

Printing occupations range in skill from those found in quick printing to specialized production occupations rarely found in other industries (table 2). Production occupations make up 53 percent of industry employment with printing machine operators accounting for the most employment of any single occupation in the industry at 14 percent.

*Prepress technicians and workers* basically prepare material for printing presses: they take what clients send to them and make it printworthy. Increasingly, prepress technicians receive the material for the pages as electronic computer files, which they load into their computers, and use digital imaging software to layout the pages. In very small shops or shops with small format digital equipment, prepress technicians can also do design for those clients who need it. “Preflight” technicians examine and edit the pages to ensure that the design, format, settings, quality and all other aspects of the automated desktop work are acceptable, and that the finished product will be completed according to the client’s specifications before it is printed.

Printing plants that use older technology and employ people in older, manual occupations, such as film strippers, lithographic dot etchers, and platemakers, are disappearing. However, because of digitization, new computerized occupations have arisen. *Scanner operators*, for example, employ electronic or computerized scanning equipment to produce and screen film separations of photographs or art to use in lithographic printing plates. *Desktop publishers* and *digital typesetters* perform typesetting and page layout on personal computers, and make sure that the files submitted by the customers are in the right format. *Illustrators* create drawings, charts, graphs, or full-color artwork to complement the text, while *graphic designers* use their creativity and computer skills to layout advertising material, brochures, and other print items that artfully bring together text, photos, and illustrations to create the kind of visual impact desired by clients.

When the material is ready, *printing machine operators* install and adjust the printing plate on the press, mix fountain solution, adjust pressure, ink the printing presses, load paper, and adjust the press to paper size. Operators also must correct any problems that might occur during a press run. *Job printers*, who usually work in small print shops, perform the prepress work as well as operate the press.

During the binding or postpress stage, the printed sheets are transformed into products such as books, catalogs, magazines, or directories. *Bookbinders* assemble books from large, flat, printed sheets of paper. They cut, saw, and glue parts to bind new books and perform other finishing operations, such as decorating and lettering, often using hand tools.

A small number of bookbinders work in hand binderies. These highly skilled workers design original or special bindings for publications with limited editions, or restore and rebind rare books. In many other shops, *bindery workers* fold and fasten groups of sheets together, often using a machine stapler, to make “signatures.” They then feed the signatures into various machines for stitching or gluing. More of these workers are now using computers on the job, and consequently must learn new skills to operate the more complex machinery.

In addition to these specialized printing occupations, office and administrative support workers, marketing and sales workers, workers in professional and related occupations, and management, business, and financial operations workers also are

**Table 2. Employment of wage and salary workers in printing by occupation, 2004 and projected change, 2004-14**  
(Employment in thousands)

| Occupation  | Employment, 2004 |         | Percent change, 2004-14 |
|---|------------------|---------|-------------------------|
|   | Number           | Percent |                         |
| <b>Total, all occupations</b> .....   | 665              | 100.0   | -9.8                    |
| <b>Management, business, and financial occupations</b> .....                                      | 45               | 6.7     | -2.8                    |
| Top executives .....  | 14               | 2.2     | -4.7                    |
| Industrial production managers.....   | 5                | 0.8     | -3.9                    |
| Cost estimators .....   | 6                | 0.8     | 2.2                     |
| <b>Professional and related occupations</b> .....   | 29               | 4.3     | -5.3                    |
| Computer specialists .....  | 8                | 1.2     | -1.9                    |
| Graphic designers .....   | 14               | 2.1     | -9.1                    |
| <b>Sales and related occupations</b> .....  | 37               | 5.5     | -4.5                    |
| Sales representatives, wholesale and manufacturing, except technical and scientific products..... | 21               | 3.1     | -3.9                    |
| <b>Office and administrative support occupations</b> .....  | 131              | 19.7    | -14.2                   |
| Bookkeeping, accounting, and auditing clerks .....  | 10               | 1.6     | -13.5                   |
| Customer service representatives .....  | 26               | 4.0     | -1.8                    |
| Production, planning, and expediting clerks .....   | 7                | 1.0     | -4.9                    |
| Shipping, receiving, and traffic clerks .....   | 13               | 2.0     | -13.0                   |
| Secretaries and administrative assistants .....   | 9                | 1.4     | -14.8                   |
| Desktop publishers .....  | 8                | 1.3     | 2.6                     |
| Office clerks, general.....   | 11               | 1.6     | -14.5                   |
| <b>Installation, maintenance, and repair occupations</b> .....                                    | 12               | 1.8     | -4.0                    |
| <b>Production occupations</b> .....   | 354              | 53.2    | -10.0                   |
| First-line supervisors/managers of production and operating workers .....                         | 27               | 4.1     | -3.9                    |
| Bindery workers .....   | 56               | 8.4     | -23.3                   |
| Bookbinders.....  | 6                | 0.9     | -7.4                    |
| Job printers .....  | 39               | 5.8     | -4.1                    |
| Prepress technicians and workers .....  | 44               | 6.6     | -18.2                   |
| Printing machine operators .....  | 93               | 14.0    | -3.9                    |
| Cutting and slicing machine setters, operators, and tenders .....                                 | 10               | 1.5     | -10.3                   |
| Inspectors, testers, sorters, samplers, and weighers .....  | 7                | 1.1     | -13.7                   |
| Packaging and filling machine operators and tenders .....   | 5                | 0.8     | -9.1                    |
| Paper goods machine setters, operators, and tenders .....   | 9                | 1.4     | -3.9                    |
| Helpers—Production workers .....  | 25               | 3.7     | -4.1                    |
| <b>Transportation and material moving occupations</b> .....                                       | 53               | 8.0     | -10.7                   |
| Truck drivers, light or delivery services .....   | 6                | 0.9     | -3.9                    |
| Laborers and freight, stock, and material movers, hand .....                                      | 9                | 1.4     | -13.5                   |
| Machine feeders and offbearers .....  | 14               | 2.1     | -23.1                   |
| Packers and packagers, hand .....   | 14               | 2.1     | -3.9                    |

Note: May not add to totals due to omission of occupations with small employment

employed in the printing industry. One occupation becoming more common are customer service representatives, also called production coordinators. Workers in this job track the various processes of production and act as liaison between clients and technicians. Thus, the customer service representative works to ensure the customer's satisfaction with the timely delivery of a high-quality product.

## Training and Advancement

Workers enter the printing industry with various educational backgrounds. Helpers generally have a high school or vocational school background, while management trainees usually have a college background. In general, job applicants must be high school graduates with mathematical, verbal, and written communication skills, and be computer literate.

Formal graphic communications programs, offered by community and junior colleges and some 4-year colleges, provide good preparation for entering the industry. Two-year programs provide technical skills, while bachelor's degree programs in graphic arts prepare persons who want to obtain advanced skills or who want to enter management.

As the industry continues to become more computerized, most workers will need a working knowledge of computers. Courses in electronics and computer technology are beneficial for anyone entering the industry, and some employers will offer tuition assistance or continuing education classes. Training in desktop publishing is also becoming more important.

Workers generally are trained informally on the job. The length of on-the-job training needed to learn skills varies by occupation and shop. For example, press operators begin as helpers and can advance to press operator positions after years of training. Bindery workers begin by doing simple tasks such as moving paper from cutting machines to folding machines. Workers learn how to operate more complicated machinery within a few months. Training often is given under the close supervision of an experienced or senior employee. Through experience and training, workers may advance to more responsible positions. Workers usually begin as helpers, advance to skilled craft jobs, and eventually may be promoted to supervisor.

Opportunities for advancement depend on the specific plant or shop. Technological changes will continue to introduce new types of computerized equipment or dictate new work procedures. Workers with computer and mechanical aptitude are especially in demand, so proper training or retraining will be essential to careers in printing.

## Outlook

Wage and salary employment in the printing and related support activities industry is projected to decline 10 percent over the 2004-14 period, compared with the 14 percent growth projected for the economy as a whole. This decline reflects the increasing computerization of the printing process, growing imports of some types of printed products, and the expanding use of the Internet, which reduces the need for printed materials. Some small and medium-size firms are also consolidating in order to afford the investment in new technology, which is expected to lead to a drop in employment. Despite the projected downturn in overall employment, retirements and turnover will continue to generate job openings in this industry throughout the decade, especially for the most skilled.

While most subsectors of the printing industry will decline, employment in commercial flexographic and digital printing should increase. Employment in manifold business forms should continue to decrease as firms take customers' orders over the Internet, allowing companies to process customer orders without printed forms. Declining employment in printing of blankbooks and looseleaf binders, printing of books, and other commercial printing will reflect increased imports of some types of printed products with ample "lead times". In response, more companies in

the industry are expanding the services they offer to include “ancillary services,” such as performing inventory and database management for clients; if these other lines of business become the main source of revenue for some companies, they will become members of other non-printing industries.

Employment growth or decline will differ among the various occupations in the printing industry, largely because of technological advances. Processes currently performed manually are being computerized, causing a shift from production occupations to computer-related occupations that perform the same function. For example, employment of desktop publishers is expected to grow slowly within the industry over the 2004-14 period as layout and design are performed electronically and transmitted to the printing press without the need to make a plate manually. In contrast, demand for prepress technicians and workers who perform these tasks manually—paste-up workers, photoengravers, camera operators, film strippers, and plate-makers—is expected to decline. Although the concepts and principles behind page layout and design are unchanged, these prepress technicians will have to learn how to perform their work using new tools.

Growth in mechanization should result in declines in the employment of bookbinders and bindery workers. The increasing sophistication of printing presses is similarly expected to lead to a slight decline in the employment of printing machine operators within the industry, as well.

New technology and equipment will require workers to update their skills to remain competitive in the job market. This should translate into good career opportunities for those who obtain the education to work with this new technology, especially in the field of electronic prepress.

**Table 3. Median hourly earnings of the largest occupations in printing, May 2004**

| Occupation   | Printing | All industries |
|--|----------|----------------|
| Sales representatives, wholesale and manufacturing, except technical and scientific products ..... | \$25.20  | \$21.83        |
| First-line supervisors/managers of production and operating workers .....                          | 22.77    | 21.51          |
| Prepress technicians and workers .....   | 15.91    | 15.30          |
| Graphic designers .....  | 15.79    | 18.28          |
| Job printers .....   | 15.67    | 15.41          |
| Printing machine operators .....   | 15.16    | 14.38          |
| Customer service representatives .....   | 14.86    | 12.99          |
| Bindery workers .....  | 11.60    | 11.31          |
| Machine feeders and offbearers .....   | 11.12    | 10.68          |
| Helpers—production workers .....   | 10.17    | 9.70           |

## Earnings

In 2004, average weekly earnings for production workers in the printing industry were \$604, compared with \$659 for all production workers in manufacturing. Weekly wages in the printing industry can vary significantly by industry sector but in commercial lithographic, the industry’s largest activity, median weekly wages are \$671. Median hourly earnings of the largest occupations in the industry also vary as shown in table 3.

The principal union in this industry is the Graphic Communications Conference of the International Brotherhood of Teamsters. About 6 percent of printing industry employees are union members or are covered by a union contract, compared with 14 percent of workers throughout the economy, but this proportion varies greatly from city to city.

## Sources of Additional Information

Information on apprenticeships and other training opportunities may be obtained from local employers such as printing shops, local offices of the Graphic Communications International Union, local affiliates of Printing Industries of America/Graphics Arts Technical Foundation, or local offices of the State employment service.

For general information on careers and training programs in printing, contact:

- NPES The Association for Suppliers of Printing, Publishing, and Converting Technologies, 1899 Preston White Dr., Reston, VA 20191-4367. Internet: <http://www.npes.org/education/index.html>
- Printing Industries of America/Graphics Arts Technical Foundation, 200 Deer Run Rd., Sewickley, PA 15143-2600. Internet: <http://www.gain.net>
- Graphic Communications Conference of the International Brotherhood of Teamsters, 1900 L St. NW., Washington, DC 20036-5007. Internet: <http://www.gciu.org>
- National Association for Printing Leadership, 75 W. Century Rd., Paramus, NJ 07652-1408. Internet: <http://www.napl.org>

Information on most occupations in the printing and publishing industry, including the following, may be found in the 2006-07 *Occupational Outlook Handbook*:

- Artists and related workers
- Bookbinders and bindery workers
- Desktop publishers
- Prepress technicians and workers
- Printing machine operators