



The latest Standard Occupational Classification puts America's occupational house in order.

## The 1998 SOC: Bridge to occupational classification in the 21<sup>st</sup> century

by Chester Levine and Laurie Salmon

**D**aguerreotypist was one of about 320 occupations included in the Nation's first occupational classification system, the 1850 Census of Population. Much has changed since then. Today, photographers have replaced daguerreotypists, the Federal Government defines nearly three times as many occupations today as it did 150 years ago, and the Census Bureau is only one of several agencies collecting occupational information.

In the late 1970s, Government economists produced the Standard Occupational Classification (SOC) for Federal agencies collecting occupational data. A 1998 revision to the SOC includes a number of improvements to the original system. This article discusses the need for a universal classification system, creation of the 1998 SOC, its implementation schedule, and plans for ongoing development.

### Classifying occupations

Occupational classification helps both the agencies collecting work force data and the people who use those data. The 1850 Census system signaled the Federal Government's recognition of the need to classify workers into occupations. Prior to the first SOC, created in 1977,



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agencies designed occupational classification systems independently. The SOC was revised in 1980. However, agencies did not fully adopt the revised SOC, causing their classification systems to drift apart. The 1998 SOC reflects the Government's latest effort to create a unified system.

Federal agencies collect and use occupational data for a variety of purposes, as do audiences who use the data. But two major problems with previous classification systems have caused difficulty for both agencies and data users.

**Data collection and use.** Agencies that collect and use occupational data do so in different ways and for different purposes. Data users, in turn, choose sources of information based on their varied needs.

Bureau of Labor Statistics (BLS) economists in the Occupational Employment Statistics program collect employment and wage data annually on nearly 800 occupations. The data are from surveys of wage and salary workers, who account for about 90 percent of workers in the Nation. The surveys classify workers according to occupational definitions.

Economists in the Bureau of the Census collect data on about 500 occupations for the decennial Census of Population and the monthly Current Population Survey. The data are based on household surveys of wage and salary, self-employed, and unpaid family workers. Data are gathered on employment status, demographic characteristics such as age and sex, and other worker characteristics such as educational attainment and hours worked. The decennial census and interim surveys classify workers according to job titles indicated by household members responding to the surveys.

Until recently, the U.S. Department of Labor's Employment and Training Administration published occupational information in the *Dictionary of Occupational Titles*. It has been replaced by the SOC-based O\*NET, the Occupational Information Network. For more information about O\*NET, see Matthew Mariani's article "Replace with a database: O\*NET replaces the Dictionary of Occupational Titles" in the spring *OOQ*. The article is also available

online at <http://www.ttrc.doleta.gov/onestop> by clicking "Report: O\*NET replaces the DOT (BLS Article)."

Other agencies, including the following, collect data specific to their programs.

- ◆ The Department of Education collects data on teachers.
- ◆ The Bureau of Health Professions gathers information on health occupations.
- ◆ The National Science Foundation surveys scientists and engineers.
- ◆ The Office of Personnel Management publishes data on occupations in the Federal Government.
- ◆ The Department of Defense maintains data on military personnel.

Data users, like the agencies that produce the data, have different interests that determine the type of data they need. For example, jobseekers and students might want salary data, but an insurance company might be more interested in demographic information.

**Problems emerging.** The existence of different occupational data collection systems in the Federal Government has presented two major problems: lack of comparability between occupational classification systems and failure to reflect changes in our economy.

The first problem arises when data collected for one program are not comparable with data collected for others. Comparisons across programs are limited to the use of crosswalks between different classification systems. For example, educational attainment data collected through the Current Population Survey are comparable with employment data from the Occupational Employment Statistics program only for occupations considered comparable in both surveys.

The second problem concerns the failure of revisions in data classification systems to keep pace with economic changes. Occupations may grow, shrink, or even disappear when the economy undergoes major changes. Such gradual



changes over the past few decades reflect, in part, advances in factory and office automation and information technology, the shift to a services-oriented economy, and increasing attention to the environment. To accommodate these occupational changes, existing systems needed restructuring as well as updating.

### Creating the 1998 SOC

In 1994, the Office of Management and Budget established the Standard Occupational Classification Revision Policy Committee to develop a new occupational classification system. The Committee agreed on several classification guidelines, including the following.

- ◆ Workers are classified in only one occupation according to type of work performed, skills, education, training, licensing, and credentials.
- ◆ Occupations are clearly defined.
- ◆ Supervisors of professional and technical workers are classified with the workers they supervise because of the similar skill, education, and background requirements; team leaders, group leaders, lead workers, head workers and other first-line supervisors who spend more than 20 percent of their time performing tasks similar to the workers they supervise are also classified with the workers they supervise.
- ◆ First-line managers and supervisors of production, service, and sales workers who spend more than 80 percent of their time performing supervisory activities are classified separately in appropriate supervisor categories because their work activities are distinct from those of the workers they supervise.
- ◆ Apprentices and trainees are classified with the occupations for which they are training; helpers are classified separately.
- ◆ Workers employed in more than one occupation should be classified in the one that requires the highest level of skill; if there is no measurable difference in skill re-

### Sample of four hierarchical levels

(Major group)	19-0000	Life, physical, and social science occupations
(Minor group)	19-1000	Life scientists
(Broad occupation)	19-1020	Biological scientists
(Detailed occupation)	19-0121	Biochemists and biophysicists
(Detailed occupation)	19-1022	Microbiologists
(Detailed occupation)	19-1023	Zoologists and wildlife biologists
(Detailed occupation)	19-1029	Biological scientists, all other

quirements, workers are included in the occupation in which they spend the most time.

These guidelines address issues and problems inherent in previous occupational classification systems. Through structural and definitional improvements, the 1998 SOC ensures comparability between surveys and mirrors the current occupational structure of the Nation. Federal agencies' universal adherence to the 1998 SOC will ease analysis of educational, demographic, economic, and other factors that affect employment, wages, and other worker characteristics.

**Structural improvements.** The 1998 SOC has more professional, technical, and service occupations and fewer production and administrative support occupations than earlier classification systems. Tables 1, 2, and 3 provide some comparisons between the new SOC and the classification system used by BLS economists for the next set of employment projections covering the 1998-2008 period.

Although the designation "professional" does not exist in the 1998 SOC, the new classification system reflects expanded coverage of occupations classified in earlier systems

**Table 1**

**Selected occupations receiving more detailed coverage in the 1998 SOC than in the Bureau of Labor Statistics 1998-2008 employment projections**

**Management**

- ◆ Chief executives
- ◆ Computer and information systems managers
- ◆ Training and development managers

**Business and financial operations**

- ◆ Agents and business managers of artists, performers, and athletes
- ◆ Emergency management specialists
- ◆ Personal financial advisors

**Computer and mathematical**

- ◆ Computer software engineers, applications
- ◆ Network and computer systems administrators

**Architecture and engineering**

- ◆ Cartographers and photogrammetrists
- ◆ Environmental engineering technicians
- ◆ Mechanical drafters

**Life, physical, and social science**

- ◆ Forensic science technicians
- ◆ Microbiologists
- ◆ Soil and plant scientists

**Community and social services**

- ◆ Child, family, and school social workers
- ◆ Health educators
- ◆ Mental health counselors

**Legal**

- ◆ Arbitrators, mediators, and conciliators
- ◆ Court reporters

**Education, training, and library**

- ◆ Archivists
- ◆ Self-enrichment education teachers

**Arts, design, entertainment, sports, and media**

- ◆ Audio and video equipment technicians
- ◆ Interpreters and translators
- ◆ Multimedia artists and animators

**Protective service**

- ◆ Animal control workers
- ◆ Lifeguards, ski patrol, and other recreational protective service workers

**Food preparation and serving related**

- ◆ Dishwashers

**Healthcare practitioners and technical**

- ◆ Anesthesiologists
- ◆ Athletic trainers
- ◆ Orthodontists

**Healthcare support**

- ◆ Massage therapists
- ◆ Medical transcriptionists
- ◆ Physical therapy assistants

**Personal care and service**

- ◆ Fitness trainers and aerobics instructors
- ◆ Makeup artists, theatrical and performance
- ◆ Slot key persons

**Sales and related**

- ◆ Advertising sales agents
- ◆ Telemarketers

**Office and administrative support**

- ◆ Customer service representatives
- ◆ Executive secretaries and administrative assistants
- ◆ Gaming cage cashiers

**Farming, fishing, and forestry**

- ◆ Animal breeders
- ◆ Farm labor contractors
- ◆ Log graders and scalers

**Construction and extraction**

- ◆ Construction laborers
- ◆ Painters, construction or maintenance
- ◆ Rotary drill operators, oil and gas

**Installation, maintenance, and repair**

- ◆ Automotive glass installers and repairers
- ◆ Commercial divers
- ◆ Security and fire alarm systems installers

**Production**

- ◆ Fiberglass laminators and fabricators
- ◆ Team assemblers

**Transportation and material moving**

- ◆ Airfield operations specialists
- ◆ Dredge operators
- ◆ Wellhead pumpers

**Table 2**

Selected occupations receiving less detailed coverage in the 1998 SOC than in the Bureau of Labor Statistics 1998-2008 employment projections

**Executive, administrative, and managerial**

- ◆ Assessors
- ◆ Claims examiners, property and casualty insurance

**Technicians and related support**

- ◆ Electroneurodiagnostic technologists

**Administrative support, including clerical**

- ◆ Advertising clerks
- ◆ Directory assistance operators
- ◆ Loan and credit clerks

**Agriculture, forestry, fishing, and related**

- ◆ Lawn service managers
- ◆ Nursery and greenhouse managers

**Service**

- ◆ Child-care workers, private household

**Precision production, craft, and repair**

- ◆ Data processing equipment repairers
- ◆ Grader, bulldozer, and scraper operators
- ◆ Photoengravers

**Operators, fabricators, and laborers**

- ◆ Offset lithographic press operators
- ◆ Screen printing machine setters and setup operators
- ◆ Sewing machine operators, nongarment

as “professional and technical.” These occupations have been dispersed among a number of major occupational groups, including computer and mathematical, community and social services, and healthcare practitioners and technical workers. Production occupations and office and administrative support occupations, on the other hand, have undergone consolidation.

The new classification structure has four hierarchical levels. At the broadest level, the 1998 SOC is composed of 23 major groups. These major groups include about 100 minor groups, 450 broad occupations, and 820 detailed occupations. For ease of comparison, occupations with similar skills or work activities are grouped at each of the four levels of hierarchy. (See sidebar, “Sample of four hierarchical levels.”)

Broad occupations include detailed occupations where necessary. For example, broad occupations such as psycholo-

**Table 3**

Comparison of number of detailed occupations in the 1998 SOC and Bureau of Labor Statistics 1998-2008 employment projections, by major occupational group

1998 SOC group	Number of detailed occupations
<b>Total</b>	<b>822</b>
Production	110
Education, training, and library	61
Construction and extraction	59
Office and administrative support	55
Healthcare practitioners and technical	53
Installation, maintenance, and repair	51
Transportation and material moving	50
Life, physical, and social science	44
Arts, design, entertainment, sports, and media	41
Architecture and engineering	35
Management	34
Personal care and service	34
Business and financial operations	30
Sales and related	22
Protective service	21
Military specific	20
Food preparation and serving related	18
Community and social services	17
Farming, fishing, and forestry	17
Computer and mathematical	16
Healthcare support	15
Building and grounds cleaning and maintenance	10
Legal	9

  

1998-2008 employment projections group	Number of detailed occupations
<b>Total</b>	<b>521</b>
Precision production, craft, and repair	112
Operators, fabricators, and laborers	101
Professional specialty	92
Administrative support, including clerical	63
Service	52
Executive, administrative, and managerial	40
Technicians and related support	30
Agriculture, forestry, fishing, and related	18
Marketing and sales	13

gist include more detailed occupations, such as industrial-organizational psychologist. But if there is little confusion about the content of a detailed occupation, such as lawyer, the broad occupation is the same as the detailed occupation.

The improved classification system enables agencies to collect data at more detailed or less detailed levels and allows for data comparability at some levels. Each



occupation is assigned a 6-digit SOC code. Data collection agencies can split a defined occupation into more detailed occupations by adding a decimal point and more digits to the SOC code. Additional levels of detail also may be used to distinguish workers who have different training, demographic characteristics, or years of experience.

**Definitional improvements.** The 1998 SOC includes several improvements over previous systems. For example, clear definitions make it easier to classify workers into occupations.

Workers who do not fit exactly into a defined occupation are classified in a “residual” occupation at the most detailed level possible. These residual categories are placed throughout the system. Like other detailed occupations, residual occupations may be individually defined for separate data collection. For example, the broad occupation biological scientists lists three types of biological scientists, and a residual occupation is added for biologists not defined separately. Geneticists, for example, are not listed separately and are included in the residual category of all other biological scientists.

The 1998 SOC also associates about 30,000 job titles with approximately 820 detailed occupational classifications. Associated titles will ensure, for example, that a podiatric surgeon is classified consistently as a podiatrist rather than as a surgeon. Job titles that are industry specific include the industry listing.

However, universal occupational classification cannot rely on job title alone. For consistency, each detailed occupation has a definition that uniquely defines the workers it includes. Definitions begin with tasks all workers in the occupation are expected to perform. The qualifier “may” precedes duties that only some workers perform. Definitions that include duties performed by workers in another occupation provide cross-references to that occupation. (See sidebar, “Sample of SOC title, definition, and associated job titles.”)

The new SOC classifies military-specific occupations separately. Workers in military occupations that are similar

to nonmilitary ones, such as physicians, cooks, and secretaries, are classified with nonmilitary workers. Those in occupations specific to the military, such as infantry, are in a separate group. However, BLS, the Bureau of the Census, and other government agencies usually will separate data collected on all military personnel—whether specific to the military or not—from data collected on the civilian labor force.

### Implementation and ongoing development

All Federal agencies that collect occupational data are expected to adopt the 1998 SOC over the next few years. Meanwhile, the 1998 SOC will continue to be updated to keep pace with changes in the work force.

**Implementation.** BLS and the Bureau of the Census have the most comprehensive occupational data collection systems. The BLS annual Occupational Employment Statistics survey will reflect the 1998 SOC in 1999; national data are expected in early 2001. The Census Bureau’s 2000 Census of Population will reflect the 1998 SOC and is expected in 2002; Current Population Survey data will be based on the new classification in 2003.

Every 2 years, the BLS Office of Employment Projections produces the *Occupational Outlook Handbook* and related publications. The 2000-01 edition of the *Handbook*, expected in early 2000, will reflect some occupational titles from the 1998 SOC. However, occupational definitions and data based solely on the 1998 SOC will be incorporated for the first time in the 2004-05 edition of the *Handbook*, which will be published in early 2004.

**Ongoing development.** To avoid problems that arose with previous classification systems, the Standard Occupational Classification Revision Policy Committee has proposed establishing a permanent SOC review committee to update the SOC regularly. This committee would consider proposals for new occupations, redefine occupations as job duties change, and amend the list of associated job titles accordingly. For example, some associated job titles in the 1998 SOC might become detailed occupations in future versions



of the SOC. The next major revision of the SOC is expected to begin in 2005, in preparation for the 2010 Census of Population.

### For more information

The 1998 SOC will be published in two volumes. Volume I contains the hierarchical structure, occupational titles and definitions, a description of the SOC revision process, and answers to frequently asked questions. Volume II contains a list of about 30,000 job titles commonly used by individuals and establishments when reporting employment by occupation; it also includes an alphabetical index of all associated titles and industries. To view the SOC online, set your browser to [http://stats.bls.gov/soc/soc\\_home.htm](http://stats.bls.gov/soc/soc_home.htm).

The 1998 SOC will be fully incorporated into the 2004-05 edition of the *Occupational Outlook Handbook*. The *Handbook* is accessible online at <http://stats.bls.gov/oochome.htm>.

O\*NET, the Occupational Information Network, adheres to the 1998 SOC. For more information, see the O\*NET website, <http://www.doleta.gov/programs/onet>.

Comparability with older classification systems is important for analyzing long-term trends in employment and other worker characteristics. To simplify historical comparisons, BLS economists are developing a crosswalk showing the relationship between occupations in the 1998 SOC and the Occupational Employment Statistics survey. The crosswalk will be available from BLS, Office of Employment and Unemployment Statistics, Division of Occupational and Administrative Statistics, Room 4840, 2 Massachusetts Ave. NE., Washington, DC 20212.

In addition, the Census Bureau is developing a crosswalk showing the relationship between occupations in the 1998 SOC and the 1990 and 2000 Censuses of Population. The crosswalk will be made available through the Bureau's website, <http://www.census.gov/hhes/www/occupation.html>. OO

### Sample of SOC title, definition, and associated job titles

(15-1081) **Network systems and data communications analysts:**

Analyze, design, test, and evaluate network systems, such as local area networks (LAN), wide area networks (WAN), Internet, intranet, and other data communications systems. Perform network modeling, analysis, and planning. Research and recommend network and data communications hardware and software. Includes telecommunications specialists who deal with the interfacing of computer and communications equipment. May supervise computer programmers.

*Illustrative examples: Internet developer; Systems integrator; Webmaster*