

Methodology

Occupational Assessor® & Survey (OA) - eDOT

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Introduction

This database edition represents a quarterly snapshot of eDOT Skills Project work measures and ERI's **Assessor Series®** job descriptions. ERI's Assessor Series are the only electronic sources for this data; the Occupational Assessor, the online application found on www.online.erieri.com, and related applications are the only legal lessees of ERI's eDOT Skills Project data.

Company Background Information

ERI, the developer and designer of the **Occupational Assessor (OA)**, collects all available salary and cost-of-living surveys and data, and conducts its own surveys. As described, compensation data is collected in a variety of methods: participant input, organization compensation analysts input, PAQ job analyses, aggregation of public domain documents (Form 990s, annual reports, US SEC data, etc.), job board research, and leasing of survey datasets from other sources.

ERI presents and markets eDOT data in both Windows and web-based formats.

ERI and affiliated companies are members of the Association of Computer-Based Systems for Career Information, and, as best allowed within the construct design of the original DOT, the **eDOT Skills Project** attempts to conform to the Association's Standards.

Note: *ERI is a compensation survey organization utilizing many available technologies. Its focus is external competitive data. It does not provide fee-for-service consulting services.*

For more information, please see the "About ERI" document available via the Help menu of any **Assessor Series** application or www.erieri.com.

OA within the Assessor Series Methodologies

While ERI collects all sources available, the Assessor Series consists of 100% employer-provided compensation data. PAQ, a project of ERI, utilizes a limited amount of employee-provided data, in part, for

its eDOT Skills Project, since work measures, such as "peer interaction," are known by the employee, but not necessarily by the employer.

ERI reviews ERI's job postings for new and emerging jobs. Captured task descriptions are incorporated into a job description that follows the construct of the US DOT. eDOT's 99 Selected Characteristics of Occupations (SCOs), including the old DOT's 64 SCOs, are assigned by semantic matching to similar jobs. Over time, the worker trait measures (all 64 original DOT, plus 35 new eDOT work measures) evolve as new analyses are added to the database with a rate of error illustrated to meet Daubert Challenge criteria.

New jobs are added to the ERI database and ERI Salary Surveys. These surveys are traditional online and/or hardcopy salary surveys with input contributed by HR analysts. ERI Salary Surveys was developed to provide online survey capabilities and international salary surveys.

Typically, after one or two full years of survey cycles, these new jobs are added to ERI's **Assessor Series**, with director-level and above jobs being added to the **Executive Compensation Assessor**. Closely abiding by FTC and US Justice Department regulations, survey data is only disclosed after a 90-day waiting period for ERI Salary Surveys, and after sufficient sample sizes exist for inclusion in the Assessor Series. Data is checked or enhanced, where possible, by ERI integration of public forms, which include annual reports, 10-Ks, proxies, and Form 990s. Where available, ERI also purchases or leases data from third-party vendors under formal contracts. Our focus is data; we do not provide fee-for-service consulting. Compensation data in the **Assessor Series** is supplied by subject matter experts, including HR analysts and the IRS.

eDOT Skills Project Introduction

The **eDOT Skills Project** is a multifaceted system for collecting and storing job analyses data, initiated in 2002. The raw data collected by the **eDOT Skills Project** is used by the **Occupational Assessor** application to provide updated values for the DOT's original 64 SCOs as well as 35 new SCOs added by ERI.

The sources and codes used to populate the eDOT Skills Project Raw Data Content and ERI's Job Availability Survey as displayed on the Raw Data Screen (of **ERI's Occupational Assessor**) include the following:

PQ Position Analysis Questionnaire (PAQ) analyses

eDOT is unique in that it utilizes the traditional subject matter expert (SME) field job analyses of PAQ. PAQ's database represents more records than those found in the 1991 DOT. Full historical records can be reviewed using the SCO Wizard found at <http://www.paq.com/index.cfm?FuseAction=Home.ContentValidity>.) PAQ field job analyses continue to this day.

eT Occupational Assessor input

Input is created when a subscriber evaluates a job using the Occupational Assessor. Agreeing to submit this data allows the eDOT Skills database to be enhanced incrementally. (No data about an individual or employer is retained). Inputs are anonymous and relate to the work that has been performed or is being performed. This is a study of the job and not the incumbent. Over the years, various e"X" variations may be found related to different modules, including some discontinued modules. A sample list of these variations include:

eD Disability Determination module input

- eS** Administrative law (SSA) input
- eV** Vocational rehab module's input
- eW** Workers' compensation eDOT input
- eF** FLSA Overtime module input
- SC** SCOs collected online before receipt of requested salary data (via leasing job boards, SalaryExpert).
- SR** Six question access to eDOT Skills Project from ERI's patented interactive surveys, ERI Salary Surveys participants, other surveys, and PAQ US FLSA determinations.
- 91** Original revised DOT - 1991 values - Most of these data points rely upon work incorporated in the 1977 edition.
- M7** Nine values modeled around the Original 1991 SCO mean value (distributed via that measure's standard error of estimate). See "Raw Data Reseeding of Original DOT Measures."
- E2** New jobs added from ERI research, ERI's Salary Surveys job posting trends, and eDOT's Subscriber Submit New Job input.

Other abbreviations found in ERI's Job Availability Log have included over time:

- eD** eDOT Disability Determination submission
- SV** ERI Surveys - ERI researcher analyzed sources; commercial surveys reporting these specific jobs (not found in Raw Data)
- US** Noncopyrighted Data - Proxies, Form 990EOs/EZs/PFs and 8-Ks, OES, OSHA, Census, etc. (not found in Job Demands' Raw Data)
- WC** Workers' Compensation - data submitted by state workers' compensation agencies, including California, Ohio, etc. (not found in Job Demands' Raw Data)
- WZ** Wizard Lookups - ERI Survey Finder - Job Availability Survey - eDOT Skills Project Raw Data - including employment and loan applicant flagging provided to lending institutions and employers (not found in Job Demands' Raw Data)

Analyses are incorporated into the **eDOT Skills Project** database for US areas only.

ERI does not provide fee-for-service, consulting, or expert witness services. Field Analysts' inputs of raw data are available for review by subscribers.

Occupational Assessor Modules

For information on how to use the latest quarterly update of the **Occupational Assessor** application, please review the Help files and Tutorial(s) available via the **Help** menu.

The **Occupational Assessor** includes four modules:

- **Job Search** – This module provides access to ERI database of jobs and SCOs.
- **Archive DOT** – This module provides convenient access to the 1991 last revised edition of the DOT. The job list includes original titles, alternate titles, and designated titles. Job descriptions include original errors. SCOs are unmodified. (See www.oalj.dol.gov/LIBDOT.HTM)
- **FLSA Overtime** – This module provides a means for determining FLSA exemption status based on FLSA overtime laws. The cloud version includes state tests.
- **Disability Determination** – This module provides the updated Selected Characteristics of Occupations (SCOs), access to the full range of SCOs including the 35 new enhanced measures, and filters that allow sorting, ranking and identification of "alternative jobs" that might assist someone disabled from his/her present occupation.

Use of OA provides access to ERI file servers for a review of relevant work. The result is the ability to review detailed Job Availability, Potential Employer and Jobs Posted data.

The following materials provide further background for the knowledgeable user.

Job Availability Survey

The Job Availability feature of the **OA** application is an assessment of the probable number of jobs that are actually in a labor market, state, or available nationally. The **eDOT Skills Project's** unique Job Availability Survey is essential to these number and types of jobs (occupations) found in the Occupational Assessor application.

Many sound sources of data exist. As described, ERI contributes the counts of all jobs surveyed for salaries.

ERI also maintains an "interest counter" of Internet queries from a variety of sources; the theory being that jobs that exist will have incumbents querying data (salaries, descriptions, and measures). These counts, plus the summation of counts of jobs and descriptions being surveyed provide evidence that the jobs exist; their ratio provides some evidence of the likely populations within any government-provided job family count. These numbers are reviewed and adjusted by ERI's proprietary population model which checks to see the ratio of complex jobs versus non-complex jobs within any job family. **SalaryExpert.com** usage also contributes to the Survey as does the data mining of job boards for counts of jobs posted in any month or year.

ERI also uses regularly updated salary survey populations. ERI also conducts its own surveys and reads IRS Form 990s and SEC form 8-Ks, 10-Ks and proxies, as well as data from GuideStar (representing health care, hospital, and charity industry categories).

This data collection allows for a proportional estimate of the frequency of jobs found within job families.

There are two methods for viewing raw Job Availability data on-line:

1. Utilize the **Job Availability Wizard** at www.eri.com/JobAvailabilityWizard.
2. View a **Summary Job Availability Log** with source information, as well as the current day's log at www.paq.com/index.cfm?FuseAction=Home.JobAvailabilityLog. The frequency of a specific job being counted, compared to all other specific jobs found within a job family, creates one of the three fractions that produce the potential range of jobs existent.

A quick find feature allows an assessment of Job Availability for any eDOT jobs.

An O*NET Comparison

The DOT was created in the labor-rich days of the Great Depression, when over 70% of jobs were in agriculture, mining, or manufacturing; its first full printed release was in 1939. Today, the US government has replaced the DOT with a job family approach: the O*NET. Some of the reasons given for the new O*NET system are listed below:

1. The DOT was created for a workplace that has disappeared.
2. The DOT is too costly to maintain; it requires far too much in the way of job analysis.
3. The modern workplace is filled with interchangeable tasks (fluid positions).
4. Work is no longer easily defined in specific job titles or descriptions.

However, the O*NET, with 753 major occupational units (OUs), uses job families that are often too general to be useful for career changers, lenders, those with disabilities, or business operations. In addition, the O*NET focuses on the college student/new entrant who can suffice with accountant or auditor rather than cost, tax, or budget accountant with specific industry knowledge. O*NET measures are more generalized (e.g., reading is required) than the DOT measured (e.g., "190 words a minute in reading comprehension"). The DOT's 64 measures have been replaced by the O*NET's 632. (For example, the DOT measures if a job requires lifting 50 pounds [Medium] and then points analysts to jobs that require less lifting (e.g., 20 pounds, etc.). The O*NET's job family uses a scale of 2 to 5, and measures Trunk, Static, and Explosive Strength of 48/40/29 with Standing/Walking/Sitting frequency measures of 75/50/33; but the O*NET cannot definitively determine if the job requires lifting and carrying of 50 pounds.) The consequence is that there are niche users (disability analysts, the Social Security Administration, career changers, forensic economists, etc.) who are not well served by O*NET.

The O*NET is essentially a data aggregator. Related salary surveys (such as the OES) continue the use of job families with worker characteristics combined in these all-encompassing job families. There are other data aggregation concerns:

- The O*NET task lists and occupational requirements for the 753 job families do not reflect task lists and requirements for a number of jobs that were folded into that Occupational Unit (OU), equivalent to a job family, from the DOT. Rehabilitation professionals utilize the terms "job", "occupation," and "occupational unit," whereas business uses "position," "job," and "job family" respectively. O*NET changes definitions by using the word "occupation" for what eDOT and 67 years of history has called "occupational units" or groups.
- Users are unable to discern entry-level work from journey-level work within a job family. The aggregation of the O*NET hides essential differences among jobs.
- The averaging of tasks combined with the averaging of ratings results in flattened scores or measures. In O*NET, many occupations seem to require lower or higher ability levels than they might in actuality.
- Many of the O*NET job families are made up of DOT job titles that are grouped by factors that are not relevant to vocational adjudication. Many of the O*NET job families reflect work that varies widely in ratings.
- O*NET's job analysis factor detail is being created by a questionnaire so large that, to entice completion, it is broken down into four sections so that four individuals fill out one-fourth of the data for each job (often in four different companies). Overshadowing this variability is the fact that O*NET contributors are the job incumbents and not necessarily trained field audit or job analysts

(as was the case with the DOT), with only small numbers of job analyses being collected (unlike PAQ, who uses trained field job analysts).

- Finally, O*NET does not publish its measures' rates of error, nor does it make the review of job analysts or non-trained incumbents' answers available to the public.

eDOT and the **DOT** assigned worker characteristic measurements are based upon the input from professional field audit or job analysts added to a computer-modeled estimate of what the original DOT field analysts might have entered (nine inputs are modeled for the original DOT worker characteristics).

It is true that the general occupation of "accountants and auditors" can suffice for those seeking general information. It is also true that industry specialization and experience within a job (and the related differences in earnings, performance, etc.) is not of much interest to career *entrants*. However, those professions that do need job measures that can differentiate experience within a specific job, assess functional capacity, identify demands of past work, and gain knowledge of factors deciding if further work can be performed, all require specific knowledge of specific jobs. O*NET, with its present design, does not yet fulfill this role. ERI believes that the Occupational Assessor fills this role.

Databases and Resources

eDOT's database is a quarterly snapshot of the **eDOT Skills Project's** latest raw data. This database is actually split into three different sub-sets, available as filters in the Occupational Assessor:

- Subject Matter Expert (SME) & Original DOT Raw Data
- Subject Matter Expert (SME), Internet Analysis & Original DOT Raw Data
- Internet Analysis & Original DOT Raw Data

The **eDOT** application displays the mean values for each SCO and the corresponding Standard Deviation. Analysts may review the contributing raw data records and calculations via the "Field Analyses Library" tab. The default is the second selection. Again, OA should be used only by experienced professionals, and the selection of the types of content sources is that of the subscriber.

Additional Resources Utilized in the Creation of the eDOT and Occupational Assessor Application

- Dictionary of Occupational Titles: 1991 (last edition); Complete 1991 US Dictionary of Occupational Titles (DOT) job descriptions, titles and codes for 12,741 jobs with its Companion DOT volume, Selected Characteristics of Occupations
- Selected Characteristics of Occupations Defined in the Revised Dictionary of Occupational Titles: 1993
- Guide for Occupational Exploration: 1984
- Revised Handbook for Analyzing Jobs: 1991
- Occupational Outlook Handbook: 2002-2003
- US 2000 and 2010 Census (for job titles)
- Industry crosswalks among DOT, PBA, SIC, and NAICS codes (2002 edition) along with industry classification systems from the UK, Japan, Australia, Mexico, totaling 23 in all.
- Job content crosswalks for DOT (10-digit), O*NET and SOC codes, Occupational Groups and Data-

People-Things (DPT), Guide for Occupational Exploration (GOE); Classification of Instructional Programs (CIP); Occupational Outlook Handbook: 2002-2003; WORK fields; Material, Product, Subject Matter & Services (MPSMS); Worker Functions, etc. Job title crosswalk for US DOT, revised ERI **eDOT**, US SOC (2), Canadian SOC (2) and NOC, UK SOC (2), U.N./Europe ISCO, OPM, historic OES, US Census, etc.

- Occupational Employment Statistics (OES) -- job family availability statistics
- Major employers, US government DOL files, and leased D&B and other credit listings, Form 990s and 5500s, SEC publicly available reports (8-Ks, 10-Ks, proxies)
- Occupational Outlook Handbook – an occupational reference text with photos, cross-walked to the O*NET
- ERI's Glossary of over 2,000 Compensation and Benefits Terms, including original DOT glossary entries

SCOs – eDOT Measures

(An asterisk (*) indicates a field that is an added, enhanced measure not found in abandoned 1991 DOT.)

Industry

eDOT code

Occupational Code

Worker Functions

Data

People

Things

Additional Measures

Creativity*

Administrative Activity*

Discretion/Independent Judgment*

Specific Vocational Preparation (SVP)

Education Level*

Literacy Demands

Mathematics Level

Language Level

Reasoning Level

Temperaments

Mental & Stress Demands

Understanding & Memory

Memory*

Short Instruction Memory*

Detailed Instruction Memory*

Sustained Concentration & Persistence

- Short Instruction Carrying Out*
- Detailed Instruction Carrying Out*
- Concentration & Attention*
- Work Schedule*
- Work Routine*
- Work Distractions*
- Work Decisions*
- Work Completion*

Social Interaction

- Public Interaction*
- Assignment/Assistance*
- Work Review*
- Peer Interaction*
- Work Behavior*

Adaptation

- Adaptation to Change*
- Hazard Awareness*
- Travel*
- Independent Planning*

Aptitudes

- General Learning Ability
- Verbal Aptitude
- Numeric Aptitude
- Spatial Aptitude
- Form Perception
- Clerical Perception
- Motor Coordination
- Finger Dexterity
- Manual Dexterity
- Eye-Hand-Foot Coordination
- Color Discrimination

Physical Demands

- Strength
- Occasionally Lift/Carry*
- Frequently Lift/Carry*
- Push/Pull*

- Walking*
- Sitting*
- Standing*
- Sit/Stand Option*

- Climbing
- Balancing
- Stooping
- Kneeling

Crouching
Crawling

Reaching
Reaching Upward*
Reaching Downward*

Handling
Fingering
Feeling
Keyboard Use*

Talking
Hearing
Tasting/Smelling

Near Acuity
Far Acuity
Depth Perception
Accommodation
Color Vision
Field of Vision

Environmental Conditions

Exposure to Weather
Extreme Cold
Extreme Heat
Wet and/or Humid
Noise Intensity Level
Vibration
Atmospheric Conditions
Proximity to Moving Parts
Exposure to Electrical Shock
Working In High, Exposed Places
Exposure to Radiation
Working With Explosives
Exposure to Toxic/Caustic Chemicals
Exposure to Injury from Biohazards*
Other Environmental Conditions

GOE Code

enhanced Skills

Work Fields Work Fields are categories of technologies that reflect how work gets done and what gets done as a result of the work activities: the purpose of the job. DOT occupations may contain one, two, or three Work Field codes.

MPSMS MPSMS are the end products upon which the work activities are performed. MPSMS is derived from the Standard Industrial Classification (SIC) codes, which identify employers by type of business. DOT occupations may contain one, two, or three MPSMS codes.

(See the ending section: Statement of Work and Research Requiring Completion)

Methodology Used to Develop Enhanced Measures

PAQ's Position Analysis Questionnaire (ePAQ), with royalties paid to PRF, and the **eDOT Project** database contain 35 new physical and mental job demand variables each – SCOs not included in the 1991 DOT. (See “SCOs – eDOT Measures.”) For example, the original DOT did not measure educational needs or the use of a keyboard. The original DOT was almost totally silent as to mental job demands related to stress.

However, ERI had been reporting SCOs in its **Assessor Series** applications for over 25 years. To ascertain what new variables might be added to the **eDOT** database in early 2003, senior researchers at ERI performed these tasks:

- reviewed the DOT/measurements and the Revised Handbook for Analyzing Jobs
- reviewed the states' worker compensation disability processes and forms with visits to state offices
- reviewed the SSA disability process and the desk papers used in physical and mental demands RFC questions
- reviewed the DRI report
- reviewed O*NET and other job analysis systems described in the DRI report
- reviewed the needs of UNUM (the largest disability carrier) via in-person interviews in Portland
- reviewed the needs of Standard (a UNUM competitor) via in-person interviews in Philadelphia
- reviewed the needs of Cigna (a UNUM competitor) via in-person interviews in Dallas
- reviewed state FLSA exemptions
- obtained and analyzed the last four years of PAQ field job analyses
- licensed **eDOT** to PAQ Services to access their historic database of subject matter field job analyses; and
- reviewed job analysis as now used in private industry

We believe this to be the most extensive review of worker characteristics and questions utilized in the United States economy related to disability that has ever been made. Please note that the DRI report did not include in-person visits to disability carriers and what we have found to be a hidden reservoir of job analyses: the workers' compensation arena. Typically, worker compensation claims include a partial analysis of a job, that part related to the injury, followed by a review of the individual's status by a physician. All states ask different questions and have different forms, but combined they can provide massive insights. For example, some states already utilize emotional/stress measures. For those interested, the State of California workers compensation format explores mental/stress job demands in some detail.

The **eDOT** approach maintains all the aspects of the DOT analysis plus enhancements gained through the extensive study and review cited above. These measures are included in the PAQ Position Analysis Questionnaire.

Job Analyses

Position Analysis Questionnaire

PAQ's Position Analysis Questionnaire (PAQc) is basically The Revised Handbook for Analyzing Jobs reworked for purposes of allowing a job analyst to review the work of (and interview) incumbents to gain information concerning a job and then reporting that data via the Internet in the same format used by the original Dictionary of Occupational Titles. This *construct* is what the United States Department of Labor, Testing and Employment Service, has used since the 1930s in creating the Dictionary of Occupational Titles and its complementary worker characteristics, SCOs. There have been some modifications by US

DOL over the years, but not many.

The purpose of The Revised Handbook for Analyzing Jobs was not for wage administration or job evaluation, but for developing physical requirements, aptitudes, and temperaments needed for a job. In turn, tests could then be developed to measure applicants' possession of these requirements and increase the odds of placing people in jobs in which they would succeed. Complementary research was done for state unemployment agencies (to assist them in training unemployed workers in other jobs) and for the military (to train soldiers/sailors in a brief period of time due to four-year terms of enlistment). Rehabilitation professionals also used the DOT, as it provided them with an extensive analysis of a job's physical and mental requirements. The US Social Security Administration used and continues to use these analyses for disability claims assessments.

In more recent times, The Revised Handbook for Analyzing Jobs provided a structured approach for recording requirements in compliance with the Americans with Disabilities Act (ADA). After the enactment of the ADA, most employers became very concerned with one provision:

"...if an employer has prepared a written description before advertising or interviewing applicants for the job, this description shall be considered evidence of the essential functions of the job." Title I, Section 101, (8) Qualified Individual with a Disability

Job descriptions, job analysis, and job evaluation have all but disappeared in the US (to be replaced by market pricing) for salary and wage administration. Those who continued to need job analyses have relied on the DOT.

Daubert, Standard Error, and Reseeding

A Note Regarding Daubert

In 1975, the US Congress passed the Rule of Evidence 702, stipulating a threshold standard for admission "that an expert by knowledge, skill, experience, training, or education may testify in the form of opinion or otherwise." Evidence must be relevant and reliable. For the latter, a four-part test exists:

1. It can be illustrated that it can be tested.
2. The data has been subjected to peer review and publication.
3. There is a known or potential **rate of error**.
4. There is a level of general acceptance in a particular discipline's community.

eDOT illustrates "rate of error" for both SCOs (via standard deviations) and estimated population statistics (relative standard errors). We know of no other source of work analysis data, including the US government's O*NET, that reports a rate of error (job analysis measures' "rate of error" is a "standard deviation").

Standard Deviation

eDOT poses several challenges regarding its reporting of standard deviation. Original DOT attributes are reported as found in materials dating back to 1965. If there was an original standard deviation reported for this data, it has been lost.

To initially estimate the standard error of a given DOT and/or SCO characteristic, ERI took all other SCO ratings and DOT ratings and checked the SCO or DOT rating in question for consistency with all the other ratings. A separate regression study was conducted for each SCO characteristic. It is assumed the standard error resulting from this methodology is a reflection of the inter-rater differences from the original

job analysis conducted by the Department of Labor. (See below: Raw Data Reseeding of original DOT measures.)

Readers should assume that almost all jobs have or will change as to their descriptions, alternative titles, industry classifications, and worker characteristics. The last real edit of the DOT by the US government occurred in 1977. Unlike the old DOT, **eDOT** contains a record of the "rate of error" for each job characteristic measure. Required by "Daubert" for any use in court (in the US), the rate refers to the standard deviation from the collection of job analysis data at the field audit level. For example, ten (10) analysts measure the same job, seven (7) state a job requires sitting 2/3 of the time, two (2) record 1/3 of the time, and one (1) reported "none." The Standard Deviation for these data is 0.70 (where 2/3 is assigned a value of 2, 1/3 a value of 1, and none a value of 0).

For jobs new to **OA** (and other applications in the **Assessor Series**), a bit more work is involved:

Each ERI job was placed in its appropriate DOT category (first three digits of the DOT number) in accordance with the definitions contained in the partially updated 1991 edition of the DOT. This same methodology applies to all new jobs added to the **OA** and the **Assessor Series**. Each ERI job was placed in the appropriate GOE category (from the Guide for Occupational Exploration), in accordance with the DOL definitions.

Based on the three-digit DOT codes and the GOE codes, eight multiple regression studies were conducted. The purpose of each study was to statistically capture the relationship among the jobs contained in the 1991 DOT. For example, a regression study captures the statistical relationship between the three-digit DOT code, the GOE code, and the respective job's data code. The mathematical relationship resulting from the study of existing jobs in the 1991 DOT was then applied to the job descriptions written by ERI.

This process resulted in an estimated rating for the "data" factor for each new ERI/OA job. The correlation value and the standard error for each of the studies were reported. After the estimates (predicted values) were calculated for the new **OA** jobs via the multiple regression equations, ERI analysts reviewed each job on a factor-by-factor basis. Both the ERI jobs and the jobs from the 1991 DOT are listed for each factor and grouped by the first 3 digits of the DOT code. Analysts compare the predicted rating for each ERI job to that of similar jobs from the 1991 DOT. Based on this review, adjustments are made to the ERI code assignment when the predicted values are not fully consistent with comparable established jobs in the 1991 DOT.

The above describes the "default" measures *for new jobs added to the OA*, initially generated for use with PAQ's Job Analysis Questionnaire (when this Input Questionnaire is accessed via the Internet, the form is self-completed to default measures) and **OA**. Field Analysts (and, on the individual site, employees holding these jobs) enter data that goes into their respective databases. Thereafter, measures of error are those created from the datasets and may change daily (e.g., if a field job analyst enters an 11th "Tax Accountant" analysis, the next quarter's Standard Deviation will change – although the median, mean, and mode, in rare cases, may not). Rates of error calculations have a "number of measure" divisor in their calculations so both the Standard Deviation and the "n" will change. Again, if a respondent answers a significant number of the questions differently from the database average for that job, that questionnaire will be flagged and not included in any calculation.

Raw Data Reseeding of Original DOT Measures

We utilize a method of computing standard deviation by examining the range of job analyses input for any particular job. The 1991 DOT came with such ratings, the range and standard deviation being unknown. We were able to calculate the ability of these factors to predict all others and thus captured some of the variance existing in these measures. The data source/file is labeled Dot91fulv1.txt and is available from the

National Crosswalk Center (www.xwalkcenter.org). That standard error was then used to construct ten (10) field audit entries, simulating/reconstructing what the original DOT field audits may have reflected. The following information is an explanation of reseeding of the original DOT measures.

We began by assuming that the standard error is the standard deviation of the analyst's ratings to a particular question for a particular job. We then examined the discrete probability distribution for independent analyst's ratings, given the number of analysts (n), the range of the rating scale (M), the mean $[E(X)]$ of the analyst's ratings, and its standard deviation (SD), or equivalently its variance $[Var(X)]$, where $0 \leq X \leq M$ is the random variable representing an analyst's rating.

The resulting model had three parameters: n , M , and $E(X)$ specified. The model consists of drawing n objects (without replacement) which contains a total of N objects, of which $M < N$ is desirable. We assume that the number of desirable objects drawn ($\leq M$) in n draws has the same probability distribution as the analysts' ratings. The mean of this distribution is given by

$$E(X) = nM/N$$

so that giving n , M , and $E(X)$ determines N . For this model only ratings $\geq M - n[M/E(X) - 1]$ are possible. If X is a random variable standing for the number of desired objects selected from a box of N objects of which M are desirable (and $N-M$ undesirable) when taking n objects without replacement from the box, its probability density function is:

$$\Pr(X=i) = C(M,i)C(N-M,n-i)/C(N,n)$$

$$\text{for } n-(N-M) \leq i \leq \text{Min}(M,n)$$

where $C(p,q)$ are the combinations of p objects taken q at a time.

The mean of this distribution is given by

$$E(X) = np \text{ where } p = M/N$$

and the variance is given by

$$\text{Var}(X) = np(1-p)(N-n)/(N-1)$$

For example with $n = 10$, $M = 8$ and $E(X) = 5$, n (the number of selections) = 10, M (the number of desired objects) = 8, and the specified mean of 5 yields N (the total number of objects) = **OA**. The theoretical variance is 1. ERI rounds these frequencies and the distribution gives the following: no zeros, ones or twos; 1 three, 2 fours, 4 fives, 2 sixes, 1 seven and no eights. The rounding preserves the mean of 5, but the variance increases from 1 to 1.2 (i.e. SD increases from 1 to 1.095). Adjusting these results by rounding down the frequencies for 3 and 7, and rounding up the frequencies for 4 and 6 gives: no zeros, ones, twos or threes; 3 fours, 4 fives, 3 sixes, and no sevens or eights. This modification preserves the mean of 5 and decreases the variance from 1.2 to 0.6 (SD = 0.775, which is closer to the desired 0.82 than 1.095 without the adjustment). For this simple problem with only 8 possible values and 10 selections this is the only practical adjustment, which PAQ believes possible or probable.

Consequently, should a subscriber review the Field Analysts' inputs for any original DOT job, he/she should find nine reconstructed data inputs, all within a range, all averaging out to the value reported by the original DOT.

In summary, there were three initial reasons why we needed to understand the variance that existed for any specific DOT descriptor:

1. Some original DOT SCOs are incorrect (e.g., receptionists not requiring "near vision."). A known standard error for a measure gave us indication of the variance and allows a check of those that appear 2 or 3 degrees outside of an expected norm in an initial audit of original DOT measures.
2. We have added thousands of modern new jobs and needed some way to estimate what the descriptors might be to put them on equal footing with original DOT measures (without conducting specific field job analyses of these new jobs). That is, we needed a way to estimate one (and only one) job analysis to create default "fill-in" values.
3. We created a database of 10 measures for each descriptor for each job, statistically recreating the distribution of ratings that might have occurred. This recreation is the "seed" data to which new field analyses will be added. (A practical example for a "Y"/"N" case: if we entered only 1 measure from the original DOT, then any new analysis would have equal value. ERI believed it needed to weight the original measures "more" and "more" is a variable. If it were a "Y" with a small variance, the recreated ratings would be Y,Y,Y,Y,Y,N,Y,Y,Y and any 11th (new analysis) of "N" would have little effect. But if the variance is large, the distribution might be Y,Y,Y,Y, Y,Y,N,N,N,N ... and 2 or 3 "N"s (and not 11) would change the **OA** measure.

These variances were used as a foundation and a stepping stone by which we hope leads to updated, reasonable **eDOT Skills Project** measures/descriptors.

In summary, for new jobs, we begin with 10 job measures rather than 1. OA allows for the cybernetic enhancement of the database (a user agrees to and submits a job analysis with are review of a claimant's present or past job). To guard against a vagary, where a single new measure would weight equally with a single initial measure, this new 1 must be added to a 10.

Industry Code Research

ERI utilizes an **enhanced Standard Industrial Classification (eSIC)** code modeled after the 1987 US SIC. Several reasons for **ERI**'s use of its own industry code **eSIC** exist: 1) The SIC replacement, the North American Classification System (NAICS), was under dispute between Canada and the United States until agreements were settled in 2007. Statistics Canada, the Economic Classification Policy Committee (ECPC) of the United States, and Mexico's Instituto Nacional de Estadística, Geografía e Informática (INEGI) agreed upon the limited industry revisions for NAICS 2007. The revision went into effect for the reference year 2007 in Canada and the United States and for 2009 in Mexico. 2) Agreements took place in 2007 for the International Standard Industrial Classification of all Economic Activities (ISIC) of the United Nations and the Statistical Classification of Economic Activities in the European Community (NACE, Nomenclature statistique des activités économiques dans la communauté européenne). The revised ISIC (Rev. 4) was adopted by the UN Statistical Commission in March 2006 for world-wide statistical classification of activities and products. NACE is the European-level statistical classification of economic activities, with the first reference year for NACE Rev. 2 being 2008. **ERI** maintains a crosswalk for these files, with Mexico, Canada, and the US having their own unique NAICS. 3) Many countries copyright their postal codes and unique industrial code variations; and whereas **ERI** leases these rights from Statistics Canada and the UK National Statistics Office, it is uneconomical to do so with 25 different country variations to the above systems. 4) Disputes exist within the EU, as the UK SIC is now an extended/evolved version of NACE. 5) "On April 9, 1997, the Office of Management and Budget (OMB) announced its decision to adopt the North American Industry Classification System (NAICS pronounced Nakes) as the industry classification system used by the statistical agencies of the United States and in doing so NAICS replaced the 1987 Standard Industrial Classification." (See www.bls.gov). Note the term, "statistical agency," as disagreements are not necessarily limited to between countries. 6) "Statistical agency" does not include the US Securities and Exchange Commission that utilizes its own unique 445 industry set of SIC-like codes. **ERI** utilizes the SEC 10-Ks, 8-Ks, and proxies as a key data source in the

creation of the **Executive Compensation Assessor & Survey**. 7) The US IRS, although asking for an NAICS code on personal and corporate tax returns, uses an "Activity Code" for nonprofit organizations formed before 1998 or the National Tax Exempt Entities code (NTEE) code for those formed thereafter. (Form 990s report neither; this code is taken from the IRS Masterfile of nonprofits, and yes, there is a gap in years when two other code types were used.) **ERI** collects and analyzes all Form 990s (nonprofits include most health care services, such as hospitals). 8) The US Social Security Administration, which historically has been the biggest user of the US DOT is not a statistical agency. The DOT became more than 15 years old in 2006, and the present DOT industries are more than 50 years old (e.g., "buttons & notions" is still used). 9) ERI leases certain financial data from private providers under Distributor [License] Agreements. Other financial information within the Licensed Products, used with permission, may be proprietary to other entities. These sources have their own unique SIC-like codes that require concordance. 10) For historical purposes and cross-industry and country comparisons, **ERI's** research requires a common industrial classification code -- including use with ERI archive data where Principal Business Activity codes (PBAs), now discontinued, are the norm. Over 30 major and minor industry codes series exist in ERI's datasets.

Disclaimer

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Patent Nos. 6,862,596 and 7,647,322