



# THE PROFESSIONAL ERGONOMIST

The Newsletter of the BCPE

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## UPDATE ON CERTIFICATION OF ERGONOMISTS

It has been more than a year since closing the Phase I of the BCPE certification procedures inundated the office with over 500 applications. Of the total 701 applications received, 572 people have been granted the CPE/CHFP designation under Phase I. Another 101 applicants were advised to sit for the BCPE examination since the Board was unable to qualify them under Phase I criteria. Some of those people have appealed that decision by submitting additional written evidence to clarify misunderstandings between the applicant and the Board regarding qualifications to meet criteria. The remaining 28 people are still "hung-up" in the process either because they have not responded to requests for additional information, or evaluation and balloting have not been concluded. Seventy three percent of those certified have chosen the CPE designation. Of all certificants 30 are from countries other than the U.S.A. (mostly Canada with 20 CPE/CHFPs). California is clearly the state with the most CPE/CHFPs (84), with Texas second (34), and Ohio third (32). Every state in the United States is represented except for Alaska, North Dakota, Wyoming, Mississippi, and Hawaii.

The BCPE gratefully acknowledges the help of the following 18 CPEs/CHFPs who served as honest, fair and scrupulous evaluators. Since the evaluations were "double blind", it is useless to try to guess who evaluated whom. Sanitization was a chore, but it worked.

Barry L. Berson MA CHFP  
Gerald Chaikin BME CPE  
Gary R. Gershzo MA CHFP  
Richard J. Hornick Ph.D. CPE  
Roger C. Jensen PhD CPE  
Michael E. Maddox Ph.D. CHFP  
James McGlothlin Ph.D. CPE  
James C. Miller Ph.D. CPE  
J. Brian Peacock Ph.D. CPE  
Wayne R. Rhodes Ph.D. CPE  
Michael W. Riley Ph.D. CPE  
J. Thomas Roth Ph.D. CPE  
John B. Shafer Ph.D. CHFP  
Robert J. Smillie Ph.D. CPE  
Leighton Smith Ph.D. CPE  
Harry Snyder Ph.D. CPE  
Robert W. Swezey Ph.D. CPE  
Thomas C. Way MS CPE

Concurrently with Phase I efforts the directors and the TDWG (Test Development Working Group) spent the spring and summer on writing, evaluating and validating the BCPE written test. Final closure was achieved at the Board's Toronto, Canada meeting on August 20 (after the IEA convention). On October 29 (after the 38th Annual HFES meeting) 36 applicants took the first Phase II examination. The participants were 29 Phase II applicants and 7 "deferrees" from Phase

I. Scoring of the multiple-choice portions of the examination is fast; grading the responses to two hours worth of essay questions will take longer. Nevertheless, results should be available by February 1, 1995, a significantly shorter turn around than what some endured during Phase I.

### PHASE II CERTIFICATION REQUIREMENTS FOR ERGONOMISTS AND HUMAN FACTORS PROFESSIONALS

As of January 1, 1994, certification criteria are (1) a masters degree in ergonomics (human factors) or equivalent educational background, (2) four years of full-time professional practice in ergonomics with emphasis on ergonomic design, (3) submission of a work product demonstrating the application of ergonomics to a product, process, or environment, and (4) a passing score on the written certification examination. These revised requirements, referred to as Phase II of the BCPE's effort, replace the Phase I program which was in effect from May 1992 until December 31, 1993.

### A CLOSER LOOK AT THE PHASE II CERTIFICATION EXAMINATION

Under Phase II rules, BCPE applicants are, among other things, required to pass a written exam on ergonomics and human factors professional practice. The examination schedule for 1995 is:

1) Monday, April 10 (at various locations in the U.S.A. and Canada)

APPLICATION DEADLINE: Friday, FEBRUARY 10!

2) Sunday, October 8 (at San Diego, CA just prior to, and collocated with, the 39th HFES Annual Meeting)

APPLICATION DEADLINE: Tuesday, AUGUST 8!

The exam was developed by selected BCPE Certificants and Directors with experience in tests and measurement. These working groups have conducted numerous test development workshops over the past year and a half.

The basis for the test development was a review of job/task analyses performed by ad hoc committees of HFES, IEA, DOD, NATO, NAS/NRC, among others, spanning 1970 to 1992. Knowledge, skill, and ability domains and topics were then categorized by the comprehensive scheme provided by *Ergonomic Abstracts* and then evaluated against the most widely used textbooks and handbooks in ergonomics/human factors. A three-section test was then designed with item development broadly spread among ergonomists practicing in business, government, and academic settings.

Part I of the test consists of 100 or more multiple-choice questions addressing basic knowledge of the field. These questions are based on common human factors/ergonomics texts such as *Human Factors in Engineering and Design* by Sanders and McCormick (McGraw-Hill, Inc.). Part II is scenario-based - - one that provides the examinee with a series of realistic work situations that might be encountered by an ergonomics practitioner. The examinee is expected to select and respond to a subset of presented scenarios. This selectivity should

enable truly qualified persons to respond adequately to this part of the exam, regardless of specific areas of ergonomic expertise and practice. The answer format in Part II is multiple-choice and fill-in. Part III is also based on scenarios, but focuses on essay-type responses.

The exam has five principal content areas spread over these three parts. *Methods and Techniques* comprises approximately 30 percent of the exam. This includes analytical tools involved in ergonomic analysis, design and evaluation. *Design of the Human-Machine Interface* comprises about 25 percent of the exam. Principles of workspace design and layout, job aids, and other design issues are addressed. *Humans as System Components (Limitations/Capabilities)* comprises approximately 25 percent of the exam. Anthropometry, biomechanics, perception, and information processing are among the issues that are examined in this content area. *Systems Design and Organization* comprises about 15 percent of the exam. Issues in this section include team performance, motivation, and related factors. *Professional Practice* comprises about 5 percent of the exam and addresses issues such as ethics, working with diverse groups, and ergonomics resources such as standards and guidelines.

## UNDERSTANDINGS AND MISUNDERSTANDINGS

As the number of BCPE certificants increases (see related article in this issue) and the rumor mills churn among certification supporters and detractors, the opportunities for growth in facts and fictions multiply. Separating the two is as easy as calling the BCPE executive office at 360-671-7601. More frequent publication of our newsletter will also help in removing many of the myths about BCPE. Here are some items that should be clarified "on the record":

- BCPE is currently not affiliated with the HFES (Human Factors and Ergonomics Society); but because all directors and most certificants are members/fellows of HFES, a mutually supportive organizational attitude exists. HFES is the "preferred provider" of information on publications, meetings, educational opportunities (programmatic and short-course), career/placement opportunities, etc. which shape the progress of the profession. A similar cooperative stance applies to the IEA (International Ergonomics Association) and its other affiliated Societies throughout the world.

- BCPE certificants are not members of the BCPE! We are not a membership organization; the Board is a non-profit, public service corporation which promotes and measures the education, skills and experiences of practitioners in the profession of ergonomics/human factors as a distinct discipline. The professional "home" of certificants can be an IEA-affiliated society (e.g., HFES, HFAC/ACE in North America). The "seasonal cottages" of certificants can be an engineering society focused on the system development area of interest (e.g., ASAE, ACM, IIE, IEEE, ANS, SAE, SID, etc.).

BCPE certificants do form a "network of qualified professionals" from which BCPE draws volunteers for its various tasks. For example, 18 certificants served as Phase I evaluators for the 701 applications which were processed. Some continue to serve on appeals panels and for Phase II applicants. Certificants nominate candidates for directorships from which the BCPE directors elect people to fill open positions on the Board. Certificants also contribute examination questions and scenarios to the TDWG (Test Development Working Group) and participate in examination scoring and psychometric analyses during test development and evaluation. In the future, certificants may be contributors to this newsletter; they may develop "ergonomics review" workshops/seminars for people planning to take the BCPE certification examination; or help the BCPE in other ways. All these activities make certificants much-valued *contributors* to meeting the BCPE mission, but they do not make for *membership* since BCPE decided early on not to compete with well-established and closely allied membership organizations.

- Phase I certification (May 1992-December 1993) was not a "grandfather" process! Phase I was designed and implemented to certify *seasoned veterans* of the profession "by waiver of examination." Of the almost 2,000 applications that were distributed, 701 were filled out and returned to BCPE. So self-evaluation for meeting BCPE criteria played a significant and effective role in Phase I. Some felt they could not meet criteria, others decided they did not need certification. Those applicants who went through the Phase I procedures will tell you that the effort and ordeal required was as arduous as preparing for a written examination spanning the profession. It was more like a "take-home" examination in which you were required to write up your professional life history and document (in detail) your involvement in *ergonomic* analysis, design, and testing/evaluation. Reports are that most applicants invested 30 to 40 hours in gathering evidence for meeting the required criteria and about 8 hours to assemble the 80 pages of documentation (with an additional 120 pages for duplicate work products/samples). This hardly compares to "grandfathering" where a short form and fee payment by those who self-designate themselves as ergonomists (or other professions) by a given date are granted certified status! For BCPE applicants strict, fair and comprehensive evaluations were conducted. Those not meeting BCPE criteria were not *denied* certification, but a decision was made contingent upon successfully passing the BCPE written certification examination (given that education and years of practice criteria were met).

The Phase I certificants provide not so much a data base on ergonomics as a research science, but more valid and reliable information than was previously available on ergonomics as a technology. The rich diversity of talent and skills contained in the BCPE Phase I sample of the profession was always envisioned as the building blocks needed for developing appropriate Phase II written examinations. With written examinations, the certification process can be simplified without sacrificing validity and reliability. Regardless of the processes and criteria used, it must be expected that measures of qualifications will distribute themselves in a bell-shaped curve fashion. There will be "false positives" in the left tail and "theoreticians" in the right tail. But overall the BCPE Phase I certificants have shifted the qualifications for providing professional services a significant amount in the direction of better quality and higher status of practice.

- BCPE was not set up as a money-making venture to take advantage of the OSHA-Ergonomics bandwagon for workplace safety and health!

Professional-practice standards development has a history in IEA affiliated societies going back to the 1960's. As Hal Hendrick Ph.D., CPE has said "certification for ergonomists has not been a rapid-prototyping process." Rather than retracing that history here, BCPE can send history buffs a list of references for their own research. The experience of other professions shows that a credible certification program is a financially risky business with high operating costs and low return on investments. That's the way it should be since the purpose is not to make money (profit) but to provide a cost-recovery service to professionals willing to be measured for their qualifications in the market place of competing ideas and services. How that works out for BCPE is described elsewhere in this newsletter. Suffice it to say here that all BCPE directors and staff have invested more in volunteer time and out-of-pocket expenses than will ever be repayable. The universal motivation is to pay back to the profession what it has provided over many years in exciting and challenging careers. A value system is the driver, not greed or elitism.

- Professionals from "related" disciplines are not automatically excluded from certification as ergonomists/human factors practitioners!

In the BCPE perspective of the profession, ergonomics is not a sub-specialty of any other profession, academic discipline, or

practice area. However, people transition into ergonomics from a variety of physical and behavioral sciences and engineering design practices. Their common basis is usually "job/task analysis." From that, different problem solving approaches are derived. For example, psychologists may derive personnel selection or training procedures (i.e. to affect the humans' performance); engineers may derive design concepts for new mechanical/electronic devices; safety professionals may derive the need for overcoming "unsafe behaviors" by means of personal protective equipment and/or warnings and instructions; occupational/physical therapists may derive treatment and/or rehabilitation protocols and injury recurrence prevention concepts, etc. Lots of people have a stake in workers and their work. While all these contributions are relevant and often valuable and necessary, they are not sufficient to be classified as ergonomics. To reach this status, analysis has to impact design where the unit of concern is the human-machine-environment system performing a specific mission. Design concepts and implementations have to be tested/evaluated for efficacy (performance, workload, safety/health, value). This chain of events is not common in other professions. Thus, while other professions/disciplines can provide a launching pad into ergonomics, the unique aspects of ergonomics must be learned and practiced in and of themselves.

## IF YOU EARNED IT, USE IT!

Americans aren't known for the use of "alphabet soup" behind their names (except perhaps in the health-care professions) as is the practice in some other regions of the world. You can see the occasional listings of P.E., CPA, CSP, etc. on business cards, letterheads or lists; and now CPE and CHFP are beginning to surface in print materials. That is encouraging for at least two reasons. One, it provides publicity on the fact that ergonomists have progressed to the point of self-regulating their profession by means of a voluntary peer-review of their qualifications; and, two, use of the CPE/CHFP indicates to the public that, while anyone can claim to be an ergonomist or human factors professional, those using the designations were willing, and successful, in measuring up to the professional-practice standards developed by BCPE.

Our recommendation is: "if you earned it, use it proudly"! An example of the variety of possible uses is the 1994 HFES Directory of Human Factors/Ergonomics Consultants. Of the 142 individual consultants listed, 68 are CPEs or CHFPs, plus eleven company listings show five companies with a total of eleven CPEs (some do not show their earned designations). The nice thing about the HFES directory is its "self-portrait" composition which allows consultants to describe themselves in their own words. Thus, it could be a valuable resource for BCPE certificants who want to network with kindred spirits. Interestingly, only 28 people use their professional designation as letters following the name. Since the identifier is used somewhere else in the text, the BCPE certification still shows. That is not the case with the advisory board of Workplace Ergonomics, a newly created supplement to the trade magazine Occupational Health & Safety, (Stevens Publishing Corporation, P. O. Box 2573, Waco, TX 76702-2573). The advisory board has 28 members of which 14 are BCPE certificants, of these only 4 are listed with "CPE" after their name.

In summary, both the BCPE and its certificants need more visibility among the general public, technocrats, bureaucrats and academics. The BCPE staff can help by providing proof-sheets of our logo to certificants who request such for use on stationery, business cards, promo materials, etc. They are registered to and owned by, BCPE, Inc., but will be "licensed for use" to current certificants. We also have a standard PRESS RELEASE (on BCPE stationery) that announces the awarding of certification to an individual. Upon request, we can send it to you or your favorite local newspaper. There is no cost to certificants for these services.

It is unfortunate (but unavoidable) that other organizations will spring up to dabble in certification of ergonomists and human factors professionals. Therefore, you need to protect your investment by

clearly showing that you are a BCPE certificant, a designation based upon thorough, comprehensive, and valid assessment of your knowledge, skills and experience in the practice of ergonomics/human factors.

## THE BOARD IN TRANSITION

With the BCPE entering its fifth year of existence, some original founders are transitioning into "emeritus" status as other directors take their place to mold future developments. Al Chapanis (CHFP #01) made room for Valerie Rice (CPE #210). Valerie brings a diverse perspective to the Board gained through a long military career and training in both health care/administration (she's also a F-AOTA, OT/L) and ergonomics (PhD, Virginia Tech). She will serve as BCPE Vice President for 1995. Our feisty and forcefully systems-development oriented Dave Meister (CPE #2) now will participate from retirement as Colin Drury (CPE #289) takes on the reigns of the Professional Standards Administration Committee, making sure that our procedures are valid, reliable and pass inspection by anyone. Doug Harris (CPE #123), of video fame through the 1987 HFES production "Human Factors Success Stories," replaces Mel Rudov (CPE #3) our ethicist and forensic orator. Doug will chair the Professional Standards Development Committee for 1995. George Peters' (CPE #6) sage advice, gained through experience with the early years of BCSP about 20 years ago, helped get BCPE off the ground in a judicious manner. His global perspective will be carried on by Ulrika Wallersteiner (CPE #699) who as a Canadian of German heritage and as president of her own consulting company is intimately familiar with the international scope of ergonomics.

A photo-record of the BCPE in transition was captured at the Board's annual business meeting in Toronto, August 20. The new directors not pictured met with some of the others in Nashville, TN on October 28. Not all changes for 1995 are radical; Harvey Cohen (CPE #7) remains Treasurer, David Cochran (CPE #8) enjoys being Corporate Secretary (as long as paperwork is handled in Bellingham, WA), and Steve Casey (CPE #10) continues his supervision of Information Dissemination. (The success of his book Set Phasers on Stun, Aegean Publishing Co., 1993 shows that he's the right person for the job.) The Board elected Jerry Duncan (CPE #9) for its President in 1995. Jerry also currently serves as Secretary-Treasurer of HFES and was lead in the BCPE test development effort. Hal Hendrick (CPE #4) served BCPE as Vice-President ('90-92) and President (1993-94) simultaneously with being President of the IEA. Now he is President-Elect of HFES and will serve BCPE as chair of InterOrganization Liaison, a natural niche in the view of anyone who knows Hal's globe-trotting ways, charming professionalism and warm hospitality.

Thus, the policies, practices and procedures of the BCPE are being shaped, implemented and nurtured by a dedicated team of professionals. They collectively and individually solicit your ideas, comments and support. There were over 100 nominations from CPEs/CHFPs to fill vacant Board positions. We thank all of you for your willingness to help, and may contact you as new opportunities for service arise.



The BCPE directors at their annual business meeting in Toronto on 20 August 1994. Back row: Ulrika Wallersteiner, Dave Cochran, Hal Hendrick, Steve Casey, Jerry Duncan. Front row: Harvey Cohen, Mel Rudov, Dave Meister, Valerie Rice, Dieter Jahns.

# THE ECONOMICS OF ERGONOMICS CERTIFICATION

Operating a certification board is much like operating any other small, service business, except that there is no return on investment (i.e. no profit). It takes a dedicated, talented and customer-oriented staff, a knowledgeable Board of Directors for governance of fiscal and policy matters, adequate facilities and equipment, and "tools" to make the processes cost-effective and user-friendly. The goal is quality performance, reasonable workload, no safety/health concerns, and value to clients and society. Corporate ergonomists (i.e., employees) often forget what sole-practitioners, or consultants, know constantly: revenues and cash flow very much determine what can be done and how it is accomplished.

The BCPE, to date, is solely financially supported by applicants for certification and certificants' maintenance fees. No government, business or philanthropic grants have been solicited or obtained. A \$20,000 loan by HFES carries a 5% interest rate and has to be repaid by January 15, 1997. Careful fiscal planning and budgeting by BCPE's treasurer H. Harvey Cohen and the staff assure viability of services provided. While total income for BCPE since incorporation has been \$146,400 (732 applicants X \$200.00) disbursements have prevented the accumulation of reserve funds for future contingencies and/or expansion of services (like publications, ergonomics refresher courses, practitioner promotions/public relations). The following table tells the story for 1994. The application-fee-income figure of \$58,537 reflects the transition from Phase I to Phase II certification as part of the total income to date. It doesn't take a CPA to recognize that BCPE is running a financially lean operation. All involved are donating more in time, money and talent than they are receiving in benefits. Administrative salaries and wages show the employment by BCPE of three staff persons: Kris Alvord, administrative assistant, works 20 to 40 hours per week depending on her college class schedule. Karel Jahns, office manager, receives wages for 20 hours/week, but she has often donated extra hours. Dieter Jahns CPE, executive director, is on half-time salary which sometimes does not cover what he is asked to do. Anyone with ideas for revenue enhancement that could be used for expanded services should let the BCPE directors know.

# ON THE BCPE DRAWING BOARDS

In addition to the routines of current operations, the BCPE is continually researching future service needs of the profession. For example, BCPE director emeritus Dave Meister, CPE has initiated a detailed demographic analysis of BCPE applicants' files in order to produce summary statistics and descriptors on who ergonomists are, what backgrounds we come from, and what we do. This information will be of interest to a variety of individuals and organizations. For instance, the HFES Job Placement Service (Tillie Vaughan, Coordinator, Phone/FAX 619-245-6513) reports that she is beginning to get inquiries regarding BCPE certified people. At the last HFES Annual Meeting she had 67 jobs and 9 internships in the data base plus 16 Bulletin Board job listings. Twenty-five companies conducted interviews looking for M.S. level (71%) people. Expertise sought was Aero Systems (12%), Communications (35%), Human-Computer Interface (65%), Consumer Products (53%), Industrial Ergonomics (35%), among others. The results of Dave Meister's analysis will show how well job offers match the talents, skills and experiences of BCPE certificants. With job markets in flux, this knowledge may provide insight into future trends of the profession.

Similarly, the BCPE is working with Bill Moroney, CPE (Chair, HFES Accreditation Review Committee) to establish linkages between academic education/training programs and certification. Concepts like "Erg. i. T." (Ergonomist-in-Training) are being investigated to facilitate smoother transitioning from schooling into the workforce of ergonomists. These and other issues are always "on the drawing boards" and will be discussed for resolution at the BCPE March 1995 Board meeting. Test implementation, ergonomics-refresher courses, and need for specialty-area certification and finances are the most pressing agenda items for now.

BCPE		
Overview of 1994 Estimated Income & Expenses		
Balance brought forward from 1993		\$32,921
Income (Year to Date 12/5/94):		
Application Fees	\$58,537	
Certificant Maintenance Fees	20,095	
Register Fee	330	
Lapel Pin Fees	170	
Miscellaneous	<u>878</u>	
YTD Total Income		<u>80,010</u>
Total Funds		112,931
Expenses (Estimated to 12/31/94):		
Administrative Salaries & Wages	51,961	
Payroll Tax, L&I, Unemployment Ins	6,125	
Office Rent	3,925	
Office Equipment (Owned & Leased)	2,716	
Maintenance and supplies	1,014	
Loan payment	5,000	
Bank charges/loan interest	2,635	
Directors' Meetings (Travel & Housing) (Denver, Toronto, Nashville)	12,842	
Information Dissemination		
Marketing	1,470	
Phone/Fax	2,376	
Printing/Copying	6,030	
Register	1,321	
Postage/Shipping	4,282	
Legal/Accounting	5,583	
Miscellaneous	<u>3,915</u>	
Total estimated expenses		<u>111,195</u>
Estimated 1994 year-end balance		\$1,736