

# THE PROFESSIONAL ERGONOMIST

The Newsletter of the BCPE

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## ETHICS IN ERGONOMICS: THE SKELETON OF SOCIAL ORDER AND TECHNOLOGICAL VALUES

by Dieter W. Jahns, CPE

As the world turns and the passage of time drives us towards a new millennium milestone in the history of humanity, there seems to be a renewed interest in debating rights, responsibilities and risks in terms of "standards of care" and "rules of conduct." The body of these standards and rules is composed of three structures which influence individual and societal behaviors:

1. Ethics - the reasoning, judgment and choices made by individuals in relation to other people and their well being based on "free will" and "moral" values (e.g., "Do no harm!")

2. Regulation - a consensus-based, voluntary adoption of procedures and rules to accomplish a common goal (e.g., engineering standards, academic standards, "best practices" design guidelines)

3. Law - the legislative and judicial rules and theories which are enforceable by government action regarding the rights and responsibilities of individuals (both "real" and "pseudo", i.e. people and corporate).

These structures are somewhat hierarchical and tend to be of different sizes and importance among various cultures and periods throughout history. For example, in times of transition, (as now from industrial to information economies), standards of conduct deteriorate and absolutes tend to lose their hold (Dennis, 1990; Toffler, 1980). Conscience and individual responsibilities are relaxed. As a result, more is expected of the law than when high moral principles prevail. Yet, as

the famous judge Dean Roscoe Pound observed at the turn of the last century, law is merely the skeleton of the social order. The skeleton must be clothed in the flesh and blood of morality. Similarly, the "regulation" of commerce, engineering, agriculture, and other creative human endeavors waxes and wanes with the balance of power among those promoting "self-interest" versus "the common good." In times and cultures where consensus for the common good is easily obtained, fewer regulations will exist because cooperation is the common sense of doing things.

Thus, the foundation for social order and technological values is ethics, with regulation and law serving as secondary, political substitutes. It would be a mistake, however, to assume that any ethical problem can be solved simply by pontificating that we should be more honest, more moral, and/or more caring about each other and the environment. An ethic is a whole system of moral values that individuals or groups follow in deciding how they ought to live, what their responsibilities are, and what they ought to teach the next generation. Rational people hardly ever live without an ethic or a system of moral values, and they inherit their values from a previous generation. A person or group may decide to switch to a different system, combine different ethical traditions, or even try to create an entirely new ethic (Van Doren, 1981).

What are the ethical challenges facing ergonomists in their professional

endeavors? There is probably a huge diversity of answers to this question, and readers of this article are encouraged to provide scenarios, commentary and other feedback to the editor for future articles on the topic. For starters, though, consider that ergonomists share a common interest with engineers in technology derived from physics, chemistry and the biological sciences; we augment that with specialized "knowledge concerning the characteristics of human beings that are applicable to the design of systems and devices of all kinds" and promote "the systematic use of such knowledge to achieve compatibility in the design of interactive systems of people, machines, and environments to ensure their effectiveness, safety, and ease of performance" (HFES, 1999, pg. 1). Given this charter, how safe is safe enough (risk assessment and criteria)? How do we balance rights and responsibilities of workers when designing new devices based on new technologies which automate some functions? Can crew size reductions be ethically justified when they eliminate jobs and/or increase workload of the remaining crew? Is it ethical to make design recommendations based on "expert opinion" rather than "empirical performance data"? How do we trade-off design, training, selection alternatives in the face of economic and legal pressures to accommodate increasingly diverse population parameters and efficiency pressures?

Currently ergonomists have fewer regulations, standards and guidelines than engineers, medical personnel and

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# NEWS FROM THE MIDYEAR MEETING

Despite weather-related travel delays, the midyear meeting got off to a good start, beginning with a half day strategic planning session facilitated by past BCPE Director, Jerry Duncan. The workshop emphasized a greater understanding of BCPE's current reality, a strong commitment to its future vision, and included the development of a mission and vision statement. BCPE's mission: to protect the public, the ergonomics profession, and its professionals by defining and assuring standards of competency, and advocating the value of ergonomics and certification. Its vision: for the BCPE to be the premier ergonomics certifying body, and BCPE certifications accepted as essential for practice across application domains and specializations.

Other noteworthy items include:

1) The fostering of a formal collaboration with the American Board of Industrial Hygiene (ABIH). For those not familiar with ABIH, ABIH is the certifying body for the Industrial Hygiene profession and offers the Certified Industrial Hygiene (CIH) designator. The BCPE feel such an alliance will be mutually beneficial to both organizations and will promote continued growth of ergonomics as a distinct and unique profession.

2) Marketing. A customer needs/satisfaction survey was discussed and agreed upon. Spearheaded by Marketing Chair Anna Wichansky, the survey has since been developed and distributed. Feedback from the survey will be used to better articulate the benefits of BCPE certification and to develop a strategic marketing plan.

3) Enhancement of the website. Ideas for improving the website are being investigated by Website Chair Ron Laughery Jr. Concepts being



*The Board of Directors at the 1999 Midyear Meeting in April. From left to right: David Alexander, MS, CPE; Kris Alvord, Executive Administrator; Bob Smillie, PhD, CPE; Brian Peacock, PhD, CPE; Anna Wichanski, PhD, CPE; Valerie Rice, PhD, CPE; Carol Stuart-Buttle, MS, CPE; Ian Noy, PhD, CPE. Not pictured: Andy Imada, PhD, CPE; Ron Laughery Jr, PhD, CPE.*

explored include offering each certificant, free of charge, his or her own web page and creating a job search feature.

4) Election of new directors. Bob Smillie, PhD, CPE and Dave Alexander, MS, CPE were each re-elected to serve second, consecutive terms as BCPE directors. Gary Orr, MS, CPE was elected to fill the position of outgoing director Ian Noy, PhD, CPE. All will serve from

1999 to 2002. Congratulations to Bob, Dave and Gary!

News from the Annual Business Meeting, just held this September in Houston, will be featured in the next issue of the newsletter. Your concerns, comments and/or suggestions are always welcome and appreciated.

## CERTIFICANTS ON THE MOVE

We would like to thank the approximately 600 certificants who returned the recent "Database Update" form and encourage each of you to keep BCPE informed of your current work and home address. The BCPE cannot know when someone moves or changes employment, and self-reported changes minimize staff time and costs. You can report a change of address by phone, fax or e-mail.

For those certificants who reported professional designations other than BCPE's with their update, we regret we are unable to include these designations in your listing. We have, however, notated these designations in our records, should it be decided in the future to include such designations in the certificant listings.

# WHY I CHOSE TO APPLY FOR AND MAINTAIN CERTIFICATION

by Thomas C. Way, CPE

When I was on the HFS Executive Council (1983-86), we addressed certification. Unfortunately, we adopted a tortuous and expensive focus group methodology to determine "who we are and what do we do?" We finally concluded that certification was too complex and too expensive but maybe should be revisited later. We just temporized.

In 1990, my friend Dieter Jahns, after serving a term on the HFS Executive Council himself, asked me to work with him at the beginning of what is now called BCPE. But I temporized. Not that I didn't support certification — I did. I had some misgivings about capability. Could we pull off what the HFS had not been able to?

Dieter's approach was direct. He assembled a group of outstanding human factors people as the first Board. They knew who they were and what they did. They identified ergonomic analysis, ergonomic design and ergonomic test and evaluation as the core themes of our profession. A qualified human factors practitioner should have training and experience in all three areas but most important, design. They established the Board of Certification in Professional Ergonomics as an independent entity and obtained seed money from HFS.

They launched Phase 1 by setting required attainment levels in the three areas and developing an application form for potential certificants to present their credentials.

I completed one of the forms, was judged to have demonstrated satisfactory credentials in analysis, design and test and evaluation, and became Certified Professional Ergonomist Number 72. Later, I helped evaluate other Phase 1 applicants.

Why had I applied and why do I maintain the certification? First, I wanted to support certification as a sign of maturation of our profession. We had begun to accredit academic programs that met criteria we established. We were working on standards that communicated human factors criteria for good product and process design. It clearly was time to establish and communicate criteria for certifying qualified human factors people.

The processes of accreditation, standardization and certification assist ergonomic decision making by codifying generalizable characteristics and helping move decision making out of the ad hoc realm.

Second, recognizing the logic and the potential market for certification, the process needed to be done well and to meet the needs of the North

American human factors profession. Indeed, certification processes were underway in Europe and elsewhere. In addition, certification of human factors people by human factors people might at least reduce preemptive human factors certification by other professions. E.g., medical, safety, industrial hygiene, computer, military, or aviation organizations might attempt to define us in terms that do not meet our needs. Finally, purveyors of courses, seminars and home study systems might offer human factors certificates by inoculation. "Take our course and receive a certificate as a human factors expert." None of these potential certifiers would have identified qualified, rounded, North American human factors people. It would take an independent body of clearly qualified human factors people to identify other people who are also qualified in the practice of human factors.

Other established achievements, while perhaps positively correlated, would not work either. Academic degree, academic rank, job title, society membership or fellowship are granted for other reasons and meet other criteria. What was needed was a way to identify qualified practitioners.

There were personal reasons to apply for and maintain certification. While I knew that my daytime employer would be indifferent to my certification, they might some day come around. The BCPE certification process provides an easily applied screening device when looking for new mid-career or senior human factors professionals. If those professionals already on staff were already certified, it would validate the idea of looking for more BCPE certificants.

For some years, I have consulted with attorneys on human factors issues. Our state does not have rules for who may call themselves, or practice as, ergonomists or human factors professionals. Attorneys and courts look for such screening devices and BCPE certification provides that. It is a cumulative thing again. The more qualified people who are certified, the more certification is validated and used.

So, both for philosophical and professional reasons I applied for and maintain my identity as a Certified Professional Ergonomist with pride.



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## LETTER TO THE EDITOR

RE: *The Past & Projected Role of Human Factors Engineering – (HFE) in the commercial maritime industry* by G.E. Miller, MA, CPE, in the March 20, 1999 (page 5) issue of TPE.

The concluding statement in the referenced article, "Marine oriented HFE specialists do not currently exist, with or without certification," is curious, at best, since it appeared in a publication of the organization that certifies HFE professionals. It may come as a surprise, but marine-oriented HFE professionals have been working in the commercial maritime industry (i.e., "commercial shipping") for many years, in this country and abroad. And, many have been properly credentialed, both from educational and experimental standpoints. A literature search would show that the substantial contribution of human error to maritime accidents has been well known for decades. In fact, the federal government, certain state governments, and even private organizations, have developed major facilities and conducted considerable research into various aspects of the person-ship-waterway system (e.g., including equipment and system design; staffing and operating procedures; and training). The U.S. Maritime Administration had an HFE R&D program from the 60's into the 80's; the U.S. Coast Guard has had HFE professionals on their staff for decades; the National Research Council formed multiple committees over the years to investigate issues relevant to the person-ship-waterway system, with publication of corresponding reports; and the IMO has been concerned with aspects of human performance for many years, to the extent they established international treaties and formed the World Maritime University. Elements of HFE in the maritime industry have been the subject of many papers and reports, published in this country and abroad.

Although their numbers may be small, marine oriented HFE specialists do "exist," and have existed for decades. Yes, I am one of them; and, I know several others.

Sincerely,

Thomas J. Hammell, PhD, CHFP

## NOTE FROM THE AUTHOR

Dr. Hammell is correct when he states that HFE professionals have worked in the maritime industry and it was certainly not my intent to belittle or ignore those HFE specialists involved with the maritime industry in the past years. I am familiar with the R&D work funded by the Maritime Administration that Dr. Hammell references, and I have worked for and with the USCG in the HFE arena for the past decade. I have assisted in writing HFE design standards issued by IMO and my personal library contains many HFE reports and papers published in the maritime area. Thus, I can personally attest to the past contributions made by HFE professionals to the maritime world.

What I was attempting to convey in the article to which Dr. Hammell took exception, was the scarcity of trained and accredited HFE professionals available to work at applying existing HFE methodologies and standards to the design of maritime facilities in general, and offshore structures in particular. This position is based on my own work history, where I have worked for every major naval architectural company and shipyard in the U.S. for nineteen years and almost never encountered another academically trained and certified HFE specialist working on the design of ships or offshore structures. The position is also based on the extreme difficulty I have had over the past decade in attempting to find other qualified and certified HFE professionals to work for companies in the maritime design field, who were desiring to hire such individuals. I know of companies who, after advertising in the HFES bulletin, using the HFES job search data base, contacting many universities with graduate HFE programs listed in the HFES graduate school listing, calling professors and individuals listed in the HFES directory and asking for references, and even advertising in local newspapers in areas where

high concentrations of HFE professionals were known to exist, have failed to find suitable applicants for their HFE job openings.

As a result of this void of HFE professionals capable of working in the design of maritime equipment and systems, I have seen persons with backgrounds as mechanical or electrical engineers, naval architects, ship masters, and even ex-marine inspectors and surveyors represent themselves as specialists in the "human element" area (the term now used in the maritime industry to denote what we in the HFE profession would call human factors engineering). This is not good for the customer of HFE services nor our profession.

—G.E. Miller, MA, CPE

## ETHICS IN ERGONOMICS

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other professionals who are dependent on technological progress. Consequently, our ethical behavior is vitally important both for the growth of the profession and the clients we serve. We promote the design and use of technology for the common good. I hope that professional ergonomists will build an ethical tradition which can be taught widely to the present and future practitioners.

### References

- Dennis, J. L. (Sept. 1990). For the common good: reclaiming our ethical tradition. *Trial Magazine*, Washington, D.C.: ATLA, pgs. 55-61.
- HFES (1999). *Directory and Yearbook: 1999-2000*. Santa Monica, CA: The Human Factors and Ergonomics Society.
- Toffler, A. (1980). *The Third Wave*. New York, NY: Bantam Books.
- Van Doren, C. (1991). *A History of Knowledge*. New York, NY: Ballantine Books.

### Suggested Reading for Further Discussion:

- Goodpaster, K. E. (1984). *Ethics in Management*. Boston, MA: Harvard Business School.
- Martin, M. W. and Schinzingler, R. (1989). *Ethics in Engineering*. New York, NY: McGraw-Hill Inc.
- Rabinbach, A. (1992). *The Human Motor*. Berkeley, CA: University of CA Press.

# CONFESSIONS OF A HUMAN FACTORS PROFESSIONAL

Book review by Jack Stuster, CPE, Anacapa Sciences, Inc., Santa Barbara, California

*The Chapanis Chronicles: 50 Years of Human Factors Research, Education, and Design.* By Alphonse Chapanis. Aegean Publishing Company, Santa Barbara, California (Address: PO Box 6790 Santa Barbara, CA 93160; Telephone: 805-964-6669). 1999. ISBN 0-9636178-9-3. 256 pages. Illustrated. Hardcover. \$34.00 + \$4.50 shipping.

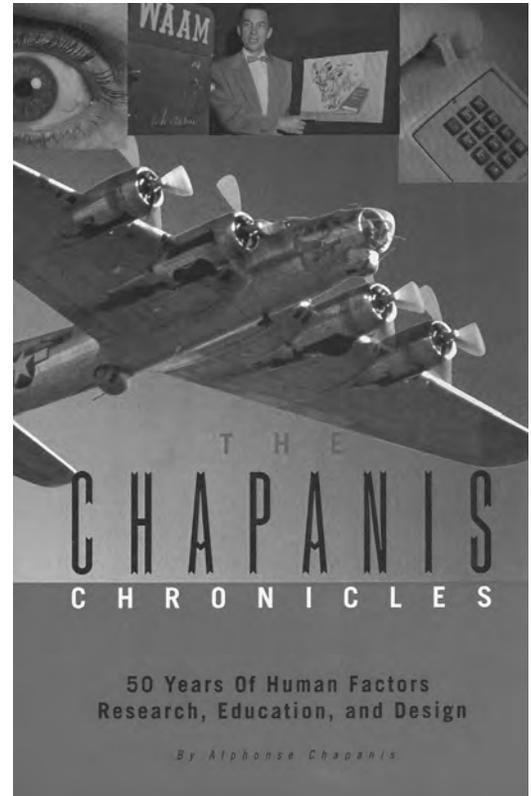
This book documents the professional life of Alphonse Chapanis, one of the founders of the human factors and ergonomics profession, and one of the founders of the Board of Certification in Professional Ergonomics; he holds BCPE certificate Number 0001. Dr. Chapanis writes in the Prologue that the purpose of the book is to capture the highlights of his career so that he could be reminded of them during his retirement, and so his family might read about some of his accomplishments and disappointments. This highly personal story includes many extraordinary accomplishments and a few disappointments, but the reader will not be disappointed.

Alphonse Chapanis helped create the human factors and ergonomics discipline beginning with his studies of pilot error, night vision, and cockpit design during World War II. He describes his misgivings about the fast-paced, applied orientation of his military research, and his realization that the approach was necessary under the conditions: "There was a war to be won." Chapanis and his surviving colleagues of the era should take great pride in their many

contributions to the designs of military equipment, procedures, and research methods; their pioneering efforts created the profession in which we now work.

In describing the highlights of his career, Alphonse Chapanis provides a history of the human factors and ergonomics profession from the personal perspective of one of the central figures in the field. The book is full of interesting anecdotes, such as the circumstances surrounding the publication of the first human factors textbook, which defined the field, literally. We also learn of some of his many contributions to the designs of items in widespread use, including the layout of the ubiquitous telephone keypad. Chapanis' discussion of his work for Bell Labs tells us something about his personality-strong opinions, which he did not hesitate to express-but it also provides a reminder of how work was performed in the days before the personal computer. I had almost forgotten about typing pools and how much time and energy was devoted to the iterative process of document production before the advent of "word processing."

As promised in the prologue, the book describes many of Chapanis' accomplishments, but he also delivers some personal disappointments. Among them are disappointments endemic to our field, such as having one's resume used in a proposal to win a contract, but never receiving any work from it, and frequent encounters with managers and engineers who consider human factors to be the application of



common sense. But some of his disappointments are monumental and truly sad, especially his forced retirement from the university he served for 35 years.

This book is about many things, but more than anything else, it is about growing old. It is this underlying theme that makes the book both disturbing and important to read. Chapanis describes his profound sadness concerning his hearing loss and failing health, which finally forced him to give up his consulting practice in 1996. And, the tone of the book, occasionally, is that of a third party reconstructing events of the distant past from a review of incomplete documents-as if the events happened to someone else. In particular, Chapanis frequently laments his inability to recall "even a glimmer of recognition" for some of the activities he describes from his remaining files. Although these

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## CONFESSIONS

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passages seemed sad to me, he is not without humor. For example, he observes that a particular speech that he cannot remember giving must have been pretty good, because his notes show that he was approached afterwards to become a consultant to IBM Federal Systems Division - a relationship that lasted for 13 years and one that he especially cherishes.

Chapanis is most enthusiastic when describing his special work as liaison scientist to the Office of Naval Research during the height of the Cold War. He describes the excitement of his trips abroad to evaluate special programs and the danger associated with these secret assignments. Chapanis' revelations about his intelligence work are important, if not controversial, contributions to the history of our discipline.

Some readers will find Chapanis' occasional complaints about specific individuals to be offensive, and others might find his admissions of a failing memory to be disturbing. However, these elements of the book are accurate reflections of the man who wrote it. Throughout his career, Chapanis had little patience with those who he perceived to be functioning in the "mists of mediocrity," and he is, in fact, growing older; age and experience provide a certain license to be candid. Further, a book that impels the reader to reflect on his or her own mortality, or to contemplate the swift passage of time, provides a valuable service. We are indebted to the author for many reasons, including this interesting, informative, and thought-provoking book.

## CERTIFICANT ROSTER SUMMER 1999

Thirty-nine candidates sat for the BCPE certification exams so far this year. Fourteen ergonomists successfully passed the exam to earn the CPE/CHFP credential. One candidate was successful in earning the AEP/AHFP credential. There are 12 new CEAs.

Those passing the Spring 1999 exams:

Jon C. Anderson MSIE CPE  
Marcella K. Bryan MS AEP  
Awwad J. Dababneh PhD CPE  
James W. Dwyer MSc CPE  
Carol J. Heffernan MS CPE  
Michael S. Grasso MS CPE  
J. Murray Gibson MIE CPE  
Kathleen Y. Kawano MS CPE  
Haniff Mohammed MS CPE  
Ken Nah PhD CPE  
Robert C. Nerhood II MS CPE  
Jerry Purswell PhD CPE  
Sandra S. Sellers MS CPE  
Scott A. Valorose MS CPE  
Kurt F. Walecki MS CPE

New Certified Ergonomics Associates are:

Gary T. Bagsby MBA CEA  
Jacqueline R. Cartier MBA CEA  
Shonna L. Cole BSEH CEA  
Jodi M. Glunz BS CEA  
Al K. McCarty CEA  
Matthew W. Morrissey MBA CEA  
David W. Munson BLA CEA  
Donald J. Nanneman MPH CEA  
Patrick J. O'Brien BS CEA  
William H. Piispanen MS CEA  
Donald D. Triggs BS CEA  
Kevin C. Weaver PT MA CEA

Carol Heffernan MS CPE, Kurt F. Walecki MS CPE, Robert C. Nerhood II MS CPE, Jerry Purswell PhD CPE, and Scott A. Valorose MS CPE transitioned from AEP to CPE with fulfillment of the four year work experience requirement and passing Parts II and III of the exam.

Malcom Pope PhD, who is now living in Scotland, has taken advantage of BCPE's reciprocity agreement with Center for

Registration of European Ergonomists (CREE) and has exchanged his CPE for the European Ergonomist, 'Eur. Erg.', designation. He is the first individual to benefit from this reciprocity.

Proctors for the BCPE exams deserve a special "thank you"; these CPEs provide a proper environment and care for exam candidates while maintaining test security and coordination with the BCPE headquarters staff during a full day in their busy work schedules. Proctors for 1999: Paul Adams PhD CPE, Thomas Albin MS CPE, Joseph Davis PhD CPE, Andrew Imada PhD CPE, Vincent Ciriello ScD CPE, Mary Brophy PhD CPE, Hal Hendrick PhD CPE, William S. Marras PhD CPE, Donald Morelli MSIE CPE, Valerie Rice PhD CPE, Carol Stuart-Buttle MS CPE, Jack Stuster PhD CPE, and Sheryl Ulin PhD CPE.

Qualifying for Associate certification by waiver of Part I of the exam were:

Steven M. Belz MS AEP  
Kermit Davis III PhD AEP  
Sue A. Ferguson PhD AEP  
Carol Heffernan MS AEP  
Karen E. K. Lewis MS AEP  
Kyle A. Wingate MS AEP,  
Michael S. O'Brien MS AEP  
Thomas Varghese MS AEP

These certificants bring current totals of BCPE certificants to 751 CPE/CHFPs and 67 AEP/AHFPs and 20 CEAs.

Ross Ailslieger MS, Khaled Al-Eisawi MS, Craig Fontaine PhD, Elinor Fulton-Suri MSc, Gary Gershzohn MA, Arthur Keller BS, Anil Mital PhD, Donald Schurman PhD, and Carla Springer PhD are no longer active certificants.

Lastly, it is with deep regret that we acknowledge the passing of James Buck PhD CPE on June 10th. We extend our condolences to his family.

# BCPE'S 1998 FINANCIAL SUMMARY

The 1998 financial report of the Board of Certification in Professional Ergonomics is presented here in a "cash basis" format. As one can see, most of BCPE's income derives from certification maintenance fees paid by certificants. Total revenues do not quite meet the total expenses. The greatest expense of salaries, wages, payroll tax results from having three part-time employees. Business meeting expenses include a midyear meeting in Denver and annual meeting in Chicago, with travel expenses and some out-of-pocket reimbursements to Directors, plus the expenditure of the annual Networking Reception.

In 1998 BCPE achieved recognition by the IRS as a tax-exempt nonprofit organization and was granted the 501(c)(6) status. There was much expense generated in this effort as seen by the accounting expenses. Unfortunately, attempts to qualify with the USPS for a nonprofit bulk mail status were not successful since USPS views BCPE as a "business league."

## Statement of Revenues and Expenses January 1, 1998-December 31, 1998

Revenues:	
Application Fees	\$16,220
Certificant Maintenance Fees	71,445
Directory	125
Lapel Pin	30
Disk Labels	453
Policies, Practice, & Procedures Handbk	45
Newsletter	251
Exam Retake Fee	480
Meister's 'The Practice of Ergonomics'	2,586
Miscellaneous	<u>387</u>
Total Revenues	\$92,022
Expenses:	
Administrative Salaries & Wages	\$48,669
Payroll Tax, L&I, Unemployment Ins	4,645
Office Rent	5,834
Office Equipment, Leased	521
Maintenance and supplies	1,818
Bank charges	1,412
Business Meetings	8,312
Information Dissemination	
Marketing	950
Phone/Fax	2,214
Printing/Copying	1,171
Directory	115
Postage/Shipping	2,816
Newsletter	1,331
Website	1,148
Legal/Accounting	7,322
Taxes	1,171
Casualty Insurance	277
Standards Development & Admin.	3,069
Capital Improvements	316
Depreciation	292
Miscellaneous	<u>1,916</u>
Total Expenses	\$95,319
Excess Expenses over Revenues	\$3,297

Observations of our treasurer, David Alexander, CPE, are that BCPE has a relatively stable operation despite an increase in expenses to develop the CEA, with little income boost from that certification. Changes anticipated for 1999 include salary for one full-time and one half-time employee (instead of three part time) with medical insurance benefits, plus gradual payment of a promissory note to Dieter Jahns, CPE for BCPE development and startup expenses.

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## CALENDAR OF EVENTS

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| December 6, 1999     | BCPE Exam in Anaheim CA prior to the National Ergonomics Conference and Exposition. Postmark deadline for application: October 6, 1999                         |
| March 13, 2000       | BCPE Exam in Los Angeles CA prior to the Institute of Industrial Engineers' Applied Ergonomics Conference. Postmark deadline for application: January 13, 2000 |
| April 10, 2000       | BCPE Exam at various locations throughout the United States and Canada. Postmark deadline for application: February 10, 2000                                   |
| April 2000           | BCPE Midyear Meeting   |
| July 2000 (date TBA) | BCPE Exam in San Diego CA at the joint IEA/HFES 2000 Meeting. Postmark deadline for application: May 2000 (date TBA)   |
| October 2000         | BCPE Annual Meeting  |