



The Institute of Textile Science

Incorporated, Canada 1956

CITATION IN HONOUR OF

DR ELIZABETH M CROWN

FOR

THE INSTITUTE OF TEXTILE SCIENCE AWARD

Dr. Crown obtained her BHSc and MSc degrees in textile science at the University of Guelph in 1967 and later a PhD in Educational Administration at the University of Alberta in 1978. Since that time she has taught and done research and administrative work at the University of Alberta in the Department of Human Ecology, formerly the Faculty of Home Economics.

She has made a major contribution to the education of young textile scientists in Canada and contributed to the field of textile and apparel science, textile and clothing policy, and consumer policy, through her research and work on national and international committees. She has supervised well over 30 masters and doctoral students and been a committee member for more than 30 other students.

Her master's research, "Correlation of the electrical resistivities of fabrics with their ability to develop and to hold charges", was published in the Textile Research Journal in 1968, and is still being quoted by researchers in the field today. Betty's continuing interest in this topic has translated to student projects and to an extensive laboratory capability and expertise for research. Recent work on electrostatics has focused on the development and dissipation of electrical charges in layers of clothing such as those used by oil field workers especially in very cold dry conditions as found in Alberta.

Dr. Crown is an enthusiastic researcher who has advanced our understanding of textile performance especially in the areas of electrostatics, flammability and thermal protective clothing. What makes her research unique is the focus on people. When Dr. Crown began her research on textile flammability, she met with local fire chiefs and emergency ward doctors asking them to keep records about fire victims and textiles involved in fires. Through these records she was able to show how often fire deaths and injury were related to textiles and smoking in bed.

She has done both theoretical and applied research. A significant and enduring result from her work is the systems approach she has taken. By considering clothing as a part of a person's near environment - thus the interaction between wearer and clothing - she has not studied a textile only in isolation but as part of a larger whole. Her research has focused on building a system through selection of the right textiles for each application into clothing designs which function and protect, taking into account all the layers and features in order to determine the effect of the whole garment system on performance, both with respect to protection and to human capability and comfort. As a result, lives have been saved because she was able to identify protective systems which provided excellent protection from flash fires.

By placing her focus on people, Betty incorporates the social sciences as well as the physical sciences by studying the attitude of workers towards their protective clothing. In fact, it was through her research on fire fighters uniforms that she learned how important it is for the wearer of protective clothing to feel physically and psychologically comfortable. This aspect of her work has been instrumental in convincing manufacturers of the importance of garment design to the flammability of the garment as a whole.

Betty has been instrumental in promoting the gradual building of an educational and research facility at the University of Alberta in protective clothing aiding the oil, forestry, fireline, and agricultural worker, the military, and the general consumer (sleepwear), among others. Cooperation and collaboration has been fostered and forged among staff and students across departmental borders at the University of Alberta. Those in textile and apparel science in the human ecology department, mechanical engineering, electrical and computing engineering, and chemistry frequently work together.

One major early achievement of this collaboration was the design, building, and commissioning of an instrumented mannequin to study the effects of heat and flame on a clothed body, to predict injury levels, and to enhance garment system design for protection against heat and flame. This facility remains unique in Canada and one of only a handful worldwide. Owning and operating this mannequin led to participation in efforts to standardize conditions and procedures for use with similar researchers in other nations. To quote her, a major overall goal is "the development of meaningful, valid, and reliable evaluation protocols and test methods for protective clothing and equipment".

Her most recent and perhaps ultimate achievement is the creation of the Protective Clothing and Equipment Research Facility - PCERF. It was her vision and tireless efforts in planning, and the submission of innumerable grant applications to build the necessary infrastructure, that enabled such a facility to be born. Grants were won from CFI (Canada Foundation for Innovation: \$537,462), ASRA (Alberta Science and Research Authority: \$537,462), and further contributions from other government and industry partners (\$55,078). PCERF was born and is now in operation, managed by Betty.

PCERF partners include various University of Alberta faculties and departments, the universities of Saskatchewan and Waterloo, EMPA (Swiss Federal Laboratories for Materials Testing and Research), the University of California at Davis, North Carolina State University, as well as industrial producers and users. Infrastructure in the PCERF includes an advanced flash/instrumented mannequin facility (including a female

mannequin), equipment to study the basic mechanism of combustion and heat transfer, a sweating torso and advanced guarded hot plate, a wide range of ESD test apparatus, and computer driven dobby looms. A further goal and capability is to devise dynamic modelling techniques and programmes for heat and moisture transfer. PCERF is a world class facility which will promote research in clothing systems, functional design studies, human comfort and performance enhancement, and contribute to development and standardization protocols.

Because she was recognized and valued for her knowledge of textiles and apparel, Dr. Crown was appointed by Cabinet to the Standards Council of Canada. She is a valued member of the following Canadian General Standards Board committees: Textile Test Methods and Terminology, Firefighters Protective Clothing, Clothing for Protection against Hydrocarbon Flash Fires, and Fireline Workwear for Forest Fire Fighters.

She has authored numerous refereed or reviewed papers and many commissioned reports. For a new book, *Textiles for Protection*, she has recently authored two chapters that summarize the research that she and others in the field have completed - Protection for Workers in the Oil and Gas Industries and Flight Suits for Military Aviators.

Through this remarkable journey, Betty has also been a partner in an enduring marriage, raised a family, been awarded Fellowship in the Institute of Textile Science (1997), and been honoured with a YWCA Tribute to Women award in the Science and Technology category (1999).

Dr. Betty Crown has made a major and lasting contribution in the field of textile science, textile technology, and clothing system research in Canada and indeed worldwide. She has earned and is certainly a very worthy recipient for the Textile Science Award of the Institute of Textile Science.