**BRACU Center for Wellness in the Workplace**

**Vision, Mission, Goals**

**Vision -** Bangladesh workplaces that are effective, efficient, safe and sustainable

**Mission -** To develop a “Center for Wellness in the Workplace” at BRAC University that serves the community through research, education and collaboration with local industry.

**Objectives**

1. Develop a steering committee with industry, government and academic representation
2. Develop budget, manpower and facilities for a “Wellness in the Workplace Center”
3. Collaborate with Bangladesh government health and safety executive
4. Collaborate with the ILO with regard to wellness in the workplace issues
5. Collaborate with company management to assure program acceptance and effectiveness
6. Develop systems, processes and criteria for application in Bangladesh industry
7. Develop research programs to analyze, design and evaluate Bangladesh workplaces
8. Develop training programs for deployment throughout Bangladesh industry
9. Develop surveillance programs for the evaluation of wellness in the work place initiatives
10. Develop continuous improvement processes to ensure acceptable progress

**Goals (per the objectives)**

1. Arrange and document monthly steering committee meetings
2. Identify budget sources, establish physical accommodations, establish “Wellness in the Workplace” staff cohort, develop funding proposals
3. Produce and deploy quarterly reports to government health and safety executive
4. Produce annual reports to ILO
5. Produce and distribute quarterly reports to company management
6. Produce analysis and evaluation processes and design guidelines for application in Bangladesh industry
7. Produce proposals to government and private sector agencies for applied research funding to
   1. Support a cohort of researchers – faculty, research staff, students and administrative staff
   2. Create Wellness in the Workplace facilities
   3. Implement analysis, design and evaluation processes
8. Deploy training programs of different scope and duration (1 day, 1 week, 1 month, 1 year) for deployment to company executives, health and safety managers, “Wellness in the Workplace” practitioners and graduate level Occupational Safety and Health professionals.
9. Establish cohort of independent specialists to apply preset processes and criteria to the evaluation of “Wellness in the Workplace” programs
10. Review and revise “Wellness in the Workplace” programs, processes and criteria on an annual basis.

**Background**

Bangladesh is a rapidly developing country with a GDP growth of approximately 8% pa. The country’s main industries are agriculture, textiles (Ready Made Garment manufacturing), construction and shipbuilding plus a broad spectrum of service and support industries. These industries, coupled with the rapid growth, are associated with a significant level of occupational injuries and worker turnover:

<https://www.ilo.org/dhaka/Areasofwork/safety-and-health-at-work/lang--en/index.htm>

It is recognized that the country also faces other major (public health) challenges such as road accidents, environmental pollution and infectious diseases. Labor turnover and occupational safety and health issues are sometimes less visible problems that hamper the nation’s aspirations to grow in international standing. Furthermore, employment, albeit with minimal compensation, is usually preferable to unemployment as has been demonstrated extensively throughout South East and East Asia over the past half century:

Nihei, Y, Kao S.R.K, Levin, D.A., Morkle, M.E. Ohtsu, M. and Peacock, J.B. “Technology, Employment Practices and Workers – A comparative study of ten cotton spinning plants in five Asian countries.” (Hong Kong, Taiwan, Malaysia, Thailand and The Philippines), Center for Asian Studies, University of Hong Kong, 1979.

More recently (2018) Marjorie van Elven writing in “Fashion United” presented the following article regarding the minimum wage issue in Bangladesh:

<https://fashionunited.uk/news/business/bangladesh-raises-minimum-wage-for-garment-workers/2018091438912>

*“The minimum wage for Bangladeshi garment workers will rise by 51 percent from December, the country’s Ministry for Labor and Employment is quoted by Reuters as saying. According to the news agency, the new minimum wage has been set at 8,000 taka (approximately 95 dollars) a month, up from 5,300 taka (63 US dollars).*

*The last time garment workers’ salaries were raised was in 2013, right after the Rana Plaza disaster, when an industrial building housing several garment factories collapsed, killing more than 1,130 workers.*

*The pay increase is the result of a long negotiation between the Bangladeshi government, garment workers and factory owners. Workers had*[*initially proposed a minimum wage of 16,000 taka*](https://fashionunited.com/news/business/clean-clothes-campaign-supports-bangladesh-garment-wage-increases/2018070622185) *(189 US dollars) at a national minimum wage board meeting in July.”*

**It is estimated that over 11,000 workers suffer fatal accidents and a further 24,500 die from work related diseases across all sectors each year in Bangladesh. It is also estimated that a further 8 million workers suffer injuries at work – many of which result in permanent disability. Although little research has taken place in Bangladesh, it is internationally recognized that most occupational deaths and injuries are entirely preventable, and could be avoided if employers and workers took simple initiatives to reduce hazards and risks at the workplace.**

The ILO is working in cooperation with the [Ministry of Labour and Employment](http://www.mole.gov.bd/), Bangladesh Employers’ Federation (BEF), National Coordination Committee for Workers Education (NCCWE), Industriall Bangladesh Council (IBC) and social partners such as the Occupational Safety and Health and Environment (OSHE) Foundation and the Bangladesh Institute of Labour Studies (BILS), work to foster a preventative safety and health culture by strengthening national occupational safety and health (OSH) systems. This includes support in the following areas:

* Updating the National OSH Profile and developing a National Plan of Action on OSH
* Working with employers organizations to cascade basic OSH training to 750,000 – 800,000 workers in 400 RMG factories
* Providing OSH capacity building to master trainers from NCCWE and IBC who will pass on these skills to some 3,000 workers
* Developing an OSH KIT for initiating and functioning Safety Committees at factory level
* Preparing advocacy and outreach campaign on OSH to help foster a culture of OSH in the country
* Supporting the establishment of OSH committees in Better Work factories

<https://www.ilo.org/dhaka/Areasofwork/safety-and-health-at-work/facet/lang--en/nextRow--10/index.htm?facetcriteria=TYP=Publication>

**Proposal for a BRAC University Center for Wellness in the Workplace**

**BRAC University is highly motivated to support the growth of the Bangladesh economy by contributing to the increase in productive, appropriately compensated, safe and healthy employment.**

It is proposed that an interdisciplinary Center for Wellness in the Workplace be developed at BRAC University with a mission to provide applied research and consulting services to industry, and education and training of government and industry managers, health and safety professionals, grass roots safety and health practitioners and individual employees. Initially the education and training initiative would be accomplished through literature and guideline development and distribution, short course programs ranging from one hour to one day to one week to one month. Later, it would explore the possibility of expansion into graduate and undergraduate courses, and applied research activity. The communication initiative would be implemented initially by targeted literature on specific industries and hazards.

**Structure**

The Center will be housed in BRAC university facilities and staffed by a combination of University specialists and industry practitioners operating initially on a part time basis. Faculty with backgrounds in medicine, engineering, ergonomics, industrial hygiene, safety and statistics / epidemiology will be needed. Group activity friendly classroom facilities will be complemented by basic laboratory access and field visits. The interdisciplinary Center will be under the joint guidance of a steering committee from BRAC Engineering, Public Health and Business faculties, and invited industry representatives. Where local expertise is not readily available, efforts will be made to engage overseas experts on either visiting or full time bases.

**Special Focus**

The application of Ergonomics (Human Factors Engineering) as the technical underpinning of Occupational Safety and Health teaching and practice would address the physiological, psychological, medical, engineering design, operational, behavioral, statistical and financial bases of safety and health outcomes.

**Development Process**

Government and industry representatives will be solicited to collaborate with the Center staff to contribute to the development, implementation and monitoring of the Center’s activities and growth.

Initial development of the BRAC Center for Wellness in the Workplace would be by research into international precedents and historical Bangladesh initiatives. Next, the Center structure would be developed iteratively through the efforts of full and part time staff and through outreach to the University and Industry steering committee members.

It should be emphasized that successful developments will be dependent on a blend of academic and domain knowledge.

**Target audiences**

The Center and its activities would be marketed to industry managers through the medium of outreach communications comprising succinct flyers and short presentations both at BRAC University and industry locations. The purpose of this outreach would be to stimulate managers to accept and recommend the Center’s programs, and allow employees to participate in education and training programs.

Current BRAC students in Public Health, Engineering and Business would be encouraged to sign up for elective courses in Occupational Ergonomics, Safety and Health.

**Pedagogy**

The education and training initiative would follow contemporary delivery processes of student participation, group activity and objective analysis and reporting practices. Specifically the instructor will develop a theme, groups of between 3 and 5 students would analyze the problem and develop alternative solutions. Finally a “one page report” would be created to succinctly communicate the problem, analysis of available evidence and design of feasible alternative solutions, with due reference to published literature. Presentations of these one page reports to the larger class audience will contribute to the development of communication skills.

**Safety and Health**

Acute incidents comprise high mechanical (plus electrical, thermal or chemical) forces over short time periods. Such incidents include falls from a height, vehicle and moving machinery accidents, manual materials handling, falling objects, cuts, trapped hands and fingers, scalds and burns etc. More insidious exposures to sustained and repetitive activities frequently result in cumulative trauma disorders / repetitive strain injuries. Whereas the former injuries result mainly from high forces, it is the temporal dimension that is the principal contributor to the, also debilitating, latter injuries / illnesses. Individual / demographic susceptibilities such as age, experience and physical resilience also contribute to injury and illness incidence. The former acute injuries require some form of physical protection / guarding whereas the latter (cumulative) conditions are usually preventable by administrative interventions, such as job assignment, enlargement or rotation.

According to Herzberg, workers are (de)motivated by such things as low wages and hazardous working conditions but respond well to increased intrinsic work content. Thus methods to increase the variety of work not only motivate the individual and reduce turnover but also contribute to the resilience and flexibility of the workforce. Such methods include self-directed work teams, job enlargement and job rotation. These methods also serve to broaden the knowledge and skills of the employees thus creating a more flexible and agile workforce.

**Sequence of Activities**

Development of a Bangladesh Center for Wellness in the Workplace

* Create a working team
* Develop a preliminary plan
* Invite a steering committee
* Develop or adapt measurement tools
* Assess content and successes of similar programs
* Collect and analyze specific safety, health, job satisfaction and productivity data
* Implement evidence based pilot safety and health programs including training, job analysis and intervention
* Evaluate the effectiveness of pilot programs
* Carry out continuous improvement to the analysis tools and intervention methods
* Expand the Occupational Safety and Health programs throughout Bangladesh industry

**Appendix 1 Supplementary Courses, background Publications and Reports:**

* Safety, Risk and Resilience Engineering (Undergraduate course)
* Occupational Biomechanics (Undergraduate course)
* Aerospace Human Factors (Undergraduate course)
* Manufacturing Ergonomics (Graduate course)
* Medical Management of Work Related Musculo-Skeletal Disorders
* Book on the Laws and Rules of Ergonomics in Design
* Technology, Employment Practices and Workers (a comparative study of ten cotton spinning plants in five Asian Countries
* Ergonomics and Design for Elderly Singaporeans
* Ergonomics 2018 – A (Singapore) National Strategy for Managing Ergonomics in the Workplace
* The Ergonomics of Production Lines
* Employment Analysis and Design for Elderly Singaporeans
* Work Analysis Tools
* Setting Compliable and Enforceable Ergonomics Standards
* The Employment of Senior Citizens in Singapore
* The Yin and Yang of Ergonomics in Design

**Appendix 2**

**A Workability Index**

**“If you can’t measure it you can’t manage it”**

A “workability index” is a single composite measure of the multiple factors associated with a job, including the workplace, physical environment, equipment, material, pacing, other operational details, and the capabilities and limitations of particular individuals.

Workability Indices take into account physical factors, such as spatial arrangements, strength, stamina, speed and skill; environmental factors such as heat, cold, noise and vibration; informational factors such as vision, hearing, memory and situational awareness, and operational / temporal factors such as static posture duration, job pacing, job cycle duration and work shift duration.

These factors can be assessed individually and the measures combined to produce a “Workability Index” that reflects the physical, cognitive, environmental, social and temporal demands of a job.

Three examples of widely validated occupational health and safety “Indices” are:

* the NIOSH Lift Index,
* RULA
* and the Snook / Liberty Mutual Psychophysical Tables for manual materials handling.

The first two do not formally address the issue of different populations, whereas the Snook Tables are presented as a “percentage of the population who are capable of safely performing a particular task.”

The Finnish “Workability Index” is a clinical tool that addresses both work demands and individual factors, including disease. Similarly, the International Classification of Function (World Health Organization) is individual centered; it describes both specific body system function and the capabilities of an individual to perform “acts of daily living.”

These “Indices” vary considerably in their complexity and scope, although, in trained hands, they have been shown to be effective measures of the relationship between work demands and populations of workers. They also may be time consuming to apply. One way of addressing these “efficiency” factors is to have a hierarchy of screening, analytic and in-depth investigation tools. This “triage”, in the emergency room sense, makes efficient use of the time and expertise of health and safety professionals, with different training levels.

One lesson learned from the NIOSH Lift Index is that the single index needs to be decomposed into its constituent parts in order to identify and rectify the job if necessary. This is because different engineers have responsibility for different components of the task, such as load (Product Engineer), spatial (Manufacturing Engineer) and temporal (Industrial / Production Engineer) factors. The NIOSH Lift Equation is a “Discounting Equation” with a set of multipliers, each taking a value between 0 and 1. Thus the intervention strategy first addresses “the low hanging fruit” and directs the intervention to the appropriate engineering specialist. One way of addressing this link between analysis and intervention strategy is to use job profiling graphs and matrices or polar graphs. Such communication tools have been used widely in such diverse areas as company financial performance and physical rehabilitation.

Another approach is to assign a “common currency” outcome metric to the cumulative effects of various qualitatively different job stressors, such a load, location, force, frequency and duration. These common currency outcomes are amalgamated to produce an Index of Workability but decomposed into their original dimensions to drive interventions. The Physical Work Strain Index uses an activity sampling approach to determine a balance between high static and high dynamic physical workloads.

Some publications by the principal investigator that describe these approaches in more detail include:

* A Discounting Model for Task Design, Applied Ergonomics Conference, IIE, 2005, Orlando, Florida
* Rule Based Ergonomics, Ergonomics in Design Vol. 12, No. 4, 2004
* Habitability Measurement in Space Vehicles and Earth Analogs, Chapter 74 in Stanton et al Handbook of Human Factors and Ergonomics Methods CRC press,
* Measurement in Manufacturing Ergonomics, Chapter 8 in Handbook of Human Factors Testing and Evaluation, Charlton and O’Brien, Lawrence Erlbaum, 2002
* (with Jen Gwo Chen and Hwa S Jung) "A Fuzzy Sets Modeling Approach for Ergonomic Workload Stress Analysis", International Journal of Industrial Ergonomics 13, 189 – 216, 1994
* (with J . G . C hen and R . E . Schlegel) " An Observational Technique for Physical Work Stress Analysis", International Journal of Industrial Ergonomics, No.3 (1989)

This proposal involves the development of a Workability Index and Job Profile for application with particular reference to vulnerable populations, including the elderly worker. The principles and operational format of internationally validated tools will form the basis of the development. It is likely also that enhancements could be made to include greater attention to the temporal dimension of static and dynamic work demands. The parameters will be subject to validation for local use in a wide variety of workplaces – from construction through logistics to the office.

**Proposed Plan of Study / Time Line for Workability Index development**

* Survey of contemporary workability indices and job profiles around the world.
* Identification of elements and processes to include in the proposed

toolset. Three months

* Design of a measurement, analysis and communication instrument

Pre-testing the instrument. Two months

* Development of training material. Two months
* Field testing and validating instrument. Three months
* Modifications and final changes to the instrument. Two months

The primary contributions of ergonomics are the design of workplaces, equipment, contexts and tasks to accommodate the capabilities and limitations of the workers. Necessary precursors of design are incisive and reliable analysis, and domain knowledge. The ergonomics community is trained in the use of many physical, sensory, cognitive, behavioral, performance and affect measurement tools. Also, there are many standard principles and rules that can be applied to design for different populations. The success of ergonomics interventions is also dependent on substantial domain knowledge. This knowledge can be obtained first hand or more commonly by working with individuals that are well versed in the context of interest. These principles of “participation” and harnessing the “voice of the customer” are essential ingredients of the ergonomics analysis and design process.

**The International Classification of Function, Disability and Health (ICF)**

The International classification of function is primarily a medical tool, developed to complement the International Classification of Disease. However the principles and methods that comprise the ICF may be used or adapted to evaluate the effects of aging on task performance.

The ICF is structured around the following broad components:

* + Body functions and structure
  + Activities (related to tasks and actions by an individual) and participation
  + Additional information on severity and environmental factors

ICF is described as the complex interaction between the health of an individual and his or her context. This description clearly links the knowledge and practice of ergonomics to the purposes of the ICF:

*Functioning and disability are viewed as a complex interaction between the health condition of the individual and the contextual factors of the environment as well as work factors. The picture produced by this combination of factors and dimensions is of "the person in his or her world". The classification treats these dimensions as interactive and dynamic rather than linear or static. It allows for an assessment of the degree of disability, although it is not a measurement instrument. It is applicable to all people, whatever their health condition. The language of the ICF is neutral as to etiology, placing the emphasis on function rather than condition or disease. It also is carefully designed to be relevant across cultures as well as age groups and genders, making it highly appropriate for heterogeneous populations.”*

*Whereas the usual focus of the ICF relates to people who are incapacitated for reasons of disease, the approach is relevant to all levels and causes of incapacity, particularly as related to an individual’s interaction with his or her context. Both the normal deterioration associated with aging and the concomitant health issues make the ICF a pertinent tool for consideration of the functioning of older people at work. The ICF is generally completed by a team of analysts, each with a different perspective on the unique individual / context interaction. Whereas the team*

*members often have a medical bias, there is no reason why a similar approach with operational team members should not be applied to the unique problem of ageing individuals. The results of this analysis can be used to guide ergonomics interventions.*

An outline of the ICF can be found through the following link:

http://www.who.int/classifications/icf/training/icfchecklist.pdf

**A Discounting Model for Physical Work Design**

The NIOSH lift equation is a “discounting model”. The actual physical load is divided by a theoretical maximum load which is multiplied by a series of fractions according to the spatial and temporal conditions of work to produce a “Lift Index”. Critics of this model argue that it is invalid in the context of other work stressors not accounted for in the equation. Other critics question the accuracy and precision of the discounting factors. One particular criticism is that the discounting factors are linear, whereas in reality a non-linear model may be more accurate.

Despite these criticisms the method is logical and intuitive, and has stood the test of time to emerge as one of the most widely used tools in physical ergonomics. (Peacock B. (2004) A Discounting Model for Task Design, Applied Ergonomics Conference, IIE, Orlando, Florida)

The principles of this discounting model may be used to assess personal factors, such as age and sex, environmental factors, such as heat, and other factors including physical encumbrance imposed by heavy restrictive clothing, such as a fireman’s turnouts or a space suit. Because of human physical capability variability, no single values for the discounting factors will be accurate. Consequently, the model should be used as a guideline for task analysis and design

rather than an absolute standard.

The discounting model is derived as follows:

A hypothetically maximum possible task for a well-conditioned and trained young male is set as 100%.

The following discounting factors are then applied:

* Female \* 0.7
* Age \*(1 - (age – 30)\*2/100)
* Thermal environment \*(1- (OC - 20)\*5 / 100)
* Task encumbrance \*(1 – (kg\*2/100)) (clothing and load)
* Task spatial context \*(1-(Distance from hips (cm)\* 1/100))
* Horizontal distance factor \*(1-(Distance moved (meters)\*0.01/100))
* Vertical distance factor \*(1-(Vertical distance climbed (meters)\*2/100))
* Task Intensity \*(1-(Exertions per minute\*10/100))
* Task Duration Factor \*(1-(Shift Length (hours)\*5/100))

Note that all these discounting factors are linear and the suggested parameters may be subject to debate. Also, for each factor the multiplier declines to zero when a maximum stressor level is reached. For a given task some or all the factors may be applied. The NIOSH Lift Equation multipliers may be substituted for the above task factors.

**A Preliminary Workability Index**

http://www.who.int/classifications/icf/training/icfchecklist.pdf