# Industrial Ergonomics Tools Qualification

The Industrial Ergonomics Tools Qualification program is designed to provide students an opportunity to extend their knowledge, familiarity and practical experience with industrial ergonomics tools in a self-paced mode. Students may study, practice with, and demonstrate competency in use of several useful industrial ergonomics tools, including analysis and screening methods, instruments, and software. At graduation, participating students may receive a certificate of qualification, identifying the extent of their studies.

## *Qualification Process*

Qualification is available in several areas of industrial ergonomics. Having selected an area, the student then studies resources provided in the Industrial Ergonomics Laboratory (supplemented by textbooks and library resources) to achieve the necessary background understanding of the context and use of tools. Each qualification has a set of required activities for the student, leading to written reports and oral examination; students may add related qualification components within an area. Successful completion of the process is recorded in laboratory records. Current qualification areas are Basic and Advanced Environmental Measurement, Manual Materials Handling Analysis, MSD Hazard Analysis, and Work Design. Other areas may be added based on student interest and laboratory resources. Access to resources in the Industrial Ergonomics Laboratory is available on a schedule established each semester and by appointment.

## *Relevance and Importance of Qualification*

Formal laboratories complement courses lectures by reinforcing course topics and introducing students to related practice tools and methods. The qualification program goes beyond this laboratory experience in several ways. First, the qualifications provide more depth than is typically found in formal labs. This depth is possible because the qualifications involve greater scope through self-paced study. Second, the qualifications provide more breadth in use of tools, instruments and methods that are not part of formal labs. Third, the qualifications allow customization by the student, to select study areas for concentration based on interest. Finally, the qualification process is more like industrial practice than curricular study.

This last point needs some explanation. Formal lab and classroom study typically involves a set of topics presented in a “package” that is intended to take the student from a lower state of knowledge in the area to a higher state of knowledge. This is done in a sequence of topics selected to provide a particular coverage to a group of students; the goal is to achieve an overall state of knowledge for the group. Engineering practice frequently involves learning on your own to achieve a particular goal. For example, a new industrial standard, a new problem in a work area, or a new means of analysis may require resolution involving becoming familiar with the problem, studying the engineering and scientific literature to learn the basis and application, and developing an implementation within the working environment.

Some recent examples of these illustrate the problems faced by the industrial engineer:

- A new Threshold Limit Value has been published for repetitive tasks involving hand work; the engineer needs to understand this TLV and how it might apply to the local work environment.
- A new process has increased the noise level such that there is concern for workers' hearing and OSHA compliance; the engineer needs to be able to measure sound levels and worker dose and recommend action based on what is found.
- A new MSD screening tool that might apply to the local work environment has been developed and tested; the engineer needs to know how this tool works and how it might be used to redesign work areas.

In all of these cases, a continuing education course might be available (at some cost to the company) but it will probably not provide all the information that is required. The engineer will be faced with the necessity to acquire new knowledge, achieve an understanding of it, and integrate it into the local work environment.

The qualification process is intended to mimic this aspect of industrial practice. Having selected a qualification area involving a set of related tools and/or instruments, the student is guided into a study of resources in this area (including technical articles, instrument and software manuals, and locally developed guides). Following this study, the student practices with the tool for familiarity and understanding. The process finishes with solving a set of realistic problems. Certification of the qualification is based on a demonstration of understanding through written reports and discussion. All but the last step are very similar to what an industrial engineer would do in a professional practice setting; the last step includes features that similar to professional practice (such as writing up a report on the problem and being able to discuss it with other professionals).

***Benefits to the Student***

Participation in the qualification process will guide the student through solution of a set of problems in a way that is similar to professional practice, but within a learning environment. The emphasis is on learning the process rather than how quickly the problem can be solved. The program also involves tools, methods and instruments that go beyond what can be learned in formal courses. Finally, each qualification is completed by having the student work certified as complete and correct; you will know when successful that your work has been verified by a knowledgeable and competent professional. While there is no official or legal body standing behind this (such as an accreditation or licensing organization), there is value in simply having had what you have learned certified by a professional. In many ways, this is similar to a corporate qualification program, where the emphasis is on what you can do. Corporations provide certificates on successful completion of training, and so does the Industrial Ergonomics Laboratory.

***Qualification Resources***

Several types of resources can be used in the qualification program. The basic resource is the Qualification CDROM. The CDROM includes

- Qualification instructions and resources in Adobe PDF format
- Requirements and instructions
- Technical papers
- Software and instrument manuals
- OSHA documents

Information on the CDROM and/or in the laboratory is available for the following software, which is installed on PC workstations in Freeman 129:

- MOST for Windows (predetermined time system)
- ErgoMOST (ergonomics modeling and analysis)
- Mannequin Pro (graphical workstation design)
- ErgoIntelligence Manual Materials Handling Expert (GUI for analysis tools)
    - Job Severity Index
    - Mital Multiple Activity Analysis
    - Energy Expenditure Analysis
    - Snook and Ciriello Push, Pull and Carry Analysis
- ErgoIntelligence Upper Extremity Analysis (GUI for analysis tools)
    - Rapid Upper Limb Assessment
    - Rapid Entire Body Analysis
    - Strain Index
    - Occupational Repetitive Actions (OCRA) Concise Exposure Index
    - Cumulative Trauma Disorders Risk Index

Application guides are available on the CDROM for the following MSD screening and analysis tools:

- Rapid Entire Body Analysis
- Rapid Upper Limb Analysis
- Strain Index
- Snook and Ciriello Push, Pull and Carry Tables

Equipment manuals (available in Freeman 129C) and pertinent extracts from manuals (on the CDROM) are available for the following instruments:

- Amprobe THWD-1 Digital Sling Psychrometer
- Chatillon CSD200 Push-pull Dynamometer
- Extech 407025 Light Meter
- Extech 407735 Sound Level Meter
- Extech 45118 Thermo-anemometer
- Metrosonics db-3060 Noise Dosimeter
- Questemp 30 Thermal Monitor (WBGT)
- Quest 1900 Integrating Sound Level Meter with OB-300 1/3 Octave Filters

Laptops, digital cameras, and other instruments may be available depending on use in instruction and research. A variety of technical papers on qualification areas and related topics are also found in document binders in Freeman 129C.