June 22, 2011 (Wednesday) 55th EOQ Congress

CONCURRENT SESSIONS **Wednesday 8:30 – 10:30**
KEMPINSKI HOTEL CORVINUS **Erzsébet tér 7-8, Budapest V.**

SALON BANDINI/MARZINO

9.3. EDUCATION OF QUALITY – QUALITY OF EDUCATION III. 8:30 – 10:30

Co-Organizer: Óbuda University

Session Chair: ***Gábor Veress****, University of Pannonia, Hungary*

9.50 Role of Applied Statistic in the Teaching of Quality
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Drégelyi-Kiss, Ágota (Hungary)

She has chemical engineering qualification obtained at Budapest University of Technology and Economics in 2000. She has been working at Óbuda University, Bánki Donát Faculty of Mechanical and Safety Engineering as Assistant Professor since 2002. She has been teaching subjects such as dimensional metrology, acceptance sampling, statistical process control and design of experiments. She has certification of EOQ Quality System Manager and she is the co-chairman of Metrology Committee of the EOQ Hungarian National Committee in Budapest.

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She has quality engineer qualification obtained at Budapest Technical University in 2005 and teacher of informatics qualification obtained at Debrecen University in 2008. She has been working at Óbuda University, Bánki Donát Faculty of Mechanical and Safety Engineering as Assistant Professor since 2005. She has been teaching subjects such as quality assurance, FMEA (Failure Mode and Effect Analysis), process improvement, informatics in quality. She has certification of EOQ Quality System Manager and EOQ Information Security Management System Manager. She is the secretary of the Terminology and Reliability Sections of the EOQ Hungarian National Committee in Budapest.

Role of applied statistics in the teaching of quality

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The quality engineers and specialists, terminated their education for potgraduate degree, are suitable for the construction, actuation, management and improvement of quality systems. Their knowledge could be used in all areas of quality as well as quality techniques and management methods. To acquire these abilities the development of the appropriate approach is necessary. One of these abilities is the statistical thinking.

Our training is at a technical university. Even though there is opportunity for students with non-technical degree to participate in our education. Their qualification is quality specialist. The syllabus of quality engineer has been prepared to satisfy the demand of both the technical and the non-technical students. It is important to us that the graduated professionals could be able to understand and expound the various statistical assays, create the evaluations.

The number of lessons in our quality education is 120 hours/semester, and it takes 4 semesters long. There was a main aspect in the development of the syllabus to support the knowledge of mathematical statistics as the students do not usually have eligible learning in this theme.

The terminology of statistics is important. During the two semesters of the roots of mathematical statistics the elementary definitions (such as average, median, standard deviation, range, etc.), distributions (e.g. binomial, Poisson, normal) and simple statistical probes (t-probe, chi-square-probe) are studied through manufacturing examples. After the certain knowledge of statistical terminology the quality statistical applications appear within the confines of different subjects.

Later during the education there are 13 subjects dealt with the application of statistics. There are more subjects in the syllabus which last for 4 semesters. The classical applied quality statistics courses are the following: design of experiments (DOE), statistical process control (SPC) and acceptance sampling (Montgomery, 2009). In the course of DOE the students meet the usability and interpretation of this statistical method through examples in 18 lessons. The SPC subject contains the process capability examinations, the design and the evaluation of Shewhart-type and special control charts and some aspects and tools of Six Sigma

philosophy. The evaluation of measurement systems takes an important part at manufacturing firms attached to SPC systems. Acceptance sampling is a useful technique for qualifying incoming bulk goods.

In the course of the so-called Process-improvement and development subject some simple techniques are used such as histogram and Pareto analysis. The analysis of quality level deals with the examination of complex systems using statistical probes for the comparison.

The statistical evaluations could be made quite simple with the help of various statistical program packages. During the solution of applied statistical exercises the understanding and knowledge of calculation methods is important, but practitioners are more interested in how to use the tools and techniques to obtain results than in the theory underlying a particular tool. (Pyzdek, 2003) Therefore there is more emphasis on the analysis of the results given by statistical software packages. There are some statistical softwares studied during the training as well as Minitab, Q-DAS, HNS-SPC. A well-equipped computer assisted metrology labor helps the studying process. For example the creation of a capability report is easy by the programs but the interpretation of the given results is more complicated. The integration of powerful computer-based tools into training is our important purpose. On the other hand the bases of mathematical statistics are essential in the discussion phase and in the implementation of process improvement.

There are some possibilities to study the practical use of these techniques during firm visiting. The statistical methods appear mostly at firms which has series production in the field of automotive industry but there are application increasingly in the field of human areas. The histogram and the Pareto analysis are generally used in human sphere (such as civil service), but there are opportunities to use the SPC techniques in this area as well. For example there is a heightened interest in the use of balanced scorecard as business metrics. SPC charts offer the added benefit of displaying how these metrics are performing over time and discerning whether or not a certain pattern represents a trend – important factors to consider if anticipation of future performance is a primary motivation for using a balanced scorecard system in the first place. (Roberts, 2005)

By using quality statistics concepts, methods and tools to identify and solve high-impact problems and issues, it will help the organization better meet its budget and enable the organization to make its budget go further, doing more with what you have. (Snee & Hoerl, 2010)

References

Montgomery, D.C. (2009): Statistical Quality Control: A modern introduction, John Wiley & Sons, Inc., Asia

Pyzdek, T. (2003): The Six Sigma Handbook, McGraw-Hill, New York

Roberts, L. (2005): SPC for right-brain thinkers, Process control for non-statisticians, ASQ Quality Press, Milwaukee, Wisconsin

Snee, R. D., Hoerl, R.W (2010): Further explanation, Clarifying point about statistical engineering, Quality Progress, Dec 2010, pp. 68-72.