

QUALITY ASSURANCE AND QUALITY CONTROL IN CHEMICAL AND PHYSICAL ANALYSIS

Klodian Dhoska, inxh.i dipl.
Faculty of Mechanical Engineering
Tirana, Albania

MSc. Altin Dorri
Faculty of Mechanical Engineering
Tirana, Albania

Dr.sc. Jorgaq Kacani
Faculty of Mechanical Engineering
Tirana, Albania

Mr.Sc. Vehbi Ramaj
Universiteti AAB
Prishtinë, Kosovë

SUMMARY

Analytical measurements are important part for many human activities and in such cases they used in order to take important decision in the problem of economy, technology of production, environment, legislation etc. Evaluation of quality in different productivities and materials, process control of produce, consumer assurance, environment protection and healthy safeguard of people are some of the important activity that based in chemical and physical analysis. Basic problem for all quality system is establishment of reliability in the results that give laboratory. But, reliability toward the laboratory must exist only if it based in reliability of measurement which prove these quality. Today the important problems of analytical measurement are establishment of quality system, quality assurance and quality control of measurements in analytical laboratory. In the end of this purpose is that laboratory must provide to consumers some analytical data with known quality (acceptable).

Keywords: assurance, control, analysis, quality, laboratory.

1. INTRODUCTION

Analytical measurements are important part for many human activities and in such cases they used in order to take important decision in the problem of economy, technology of production, environment, legislation etc. Evaluation of quality in different productivities and materials, process control of produce, consumer assurance, environment protection and healthy safeguard of people are some of the important activity that based in chemical analyses. One important point of this reason is the including always in growing the number of the countries in International Economic and Trade. Essential request is the assessment of produce and service that will be compared between different countries. Today, for this purpose precede some national and international organization which have for their object work the standardization of a measurement method, quality of product and accreditation of laboratory. For aftermath can remember directive and international and European standards which help a lot in quality assurance and quality control. Important standard which used in these fields are ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories" and ISO/IEC 9000 "Quality Management System". Basic problem

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2. QUALITY SYSTEM IN ANALYTICAL LABORATORY

One of the basic problems in nowadays is reliability of the analytical result almost in the field of international trade, environmental protection, and transport accuracy, implementation of the legislation and normative, medical treatment and healthy safeguard of people. For a long time was looked which will be necessity to assesses the performance of the method and to monitored the quality of analysis. Method that is used for this reason has been from different way starting by assessment of the experience capacitive of analyst until rigorous assessment of the statistical method. The result of the analysis may be consider as the product of the analytical laboratory and says that their quality can assess and improve. Quality system of the laboratory shall include all the aspect of their work and will be able to demonstrate that their service is with best quality. These does it means that could take in consideration all the components of quality system which are shown in the figure 1.

In order to evaluate the performance of the method in chemical and physical analysis and a quality of the obtained results is needed to establish which parameters shall be determined in method. Most of the cases required to evaluate the precision, accuracy of the method, systematic error (bias), selectivity and specificity. One important characteristic in chemical and physical analysis is own connection in directly manner with object that analyze as is the sample. Furthermore, establishment of quality system made the possibility to prevent errors in accomplishment of analysis and the effects that are in connection with it. The prevention of the errors decreases necessity to repeat the analysis and the importance is to avoid the possibility that errors of the result to arrive at clients. The reason in quality system is to guarantee if are describe all detailed needed, in the manner that all the links of quality measurement are in control and after will see that all the analytical results are with quality declared[2,3].

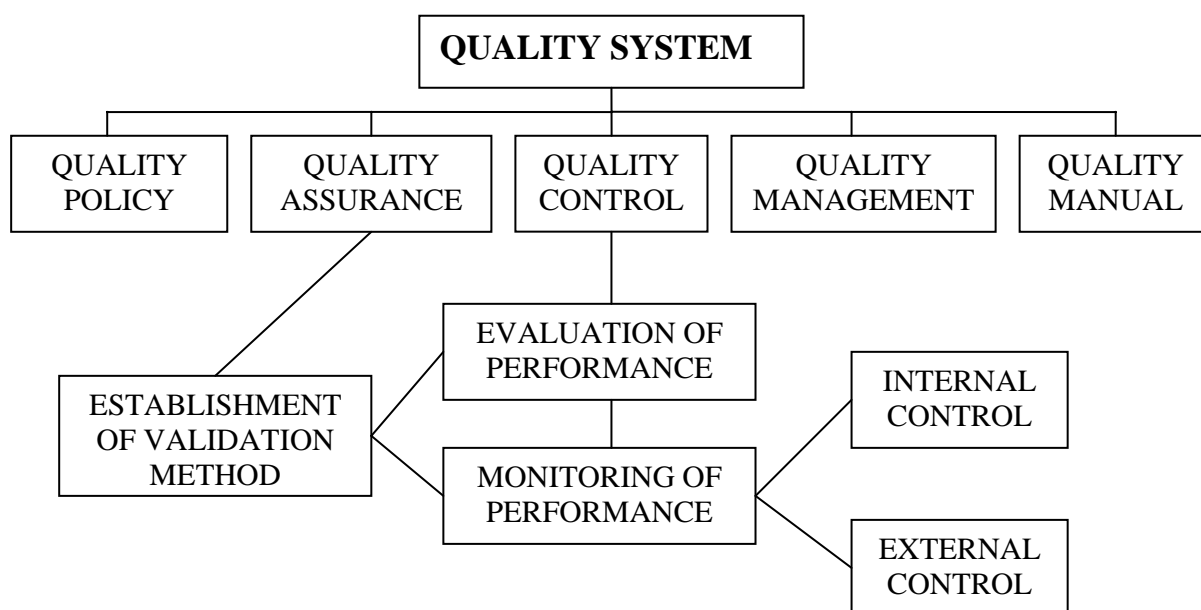


Figure 1. Construction scheme for quality system

2.1 Factor that influence in organization and operation of the quality system

The important factor that influence in organization and operation of the quality system at analytical laboratory are:

- Economical factor
- Legislation
- Management
- Infrastructure (tools, environmental and apparatus)
- Level staff and their motivation

Meanwhile, tools that have available analytical laboratories for constructing the quality system are:

- Apparatus (level and their maintenance), reagents and other materials
- Reference materials (RM) and certificate reference materials (CRM)
- Evaluation method and quality control charts
- Inter-laboratory Comparison
- Qualification and training staff
- Quality manual

All the staff of laboratory shall include in quality system to beginning from general manager, analyst and assistant personal. Best manner to ensure that quality system work in good condition is that it allocates one person or one commission, independent from laboratory staff which has responsibility to control and improve the quality system [3,4].

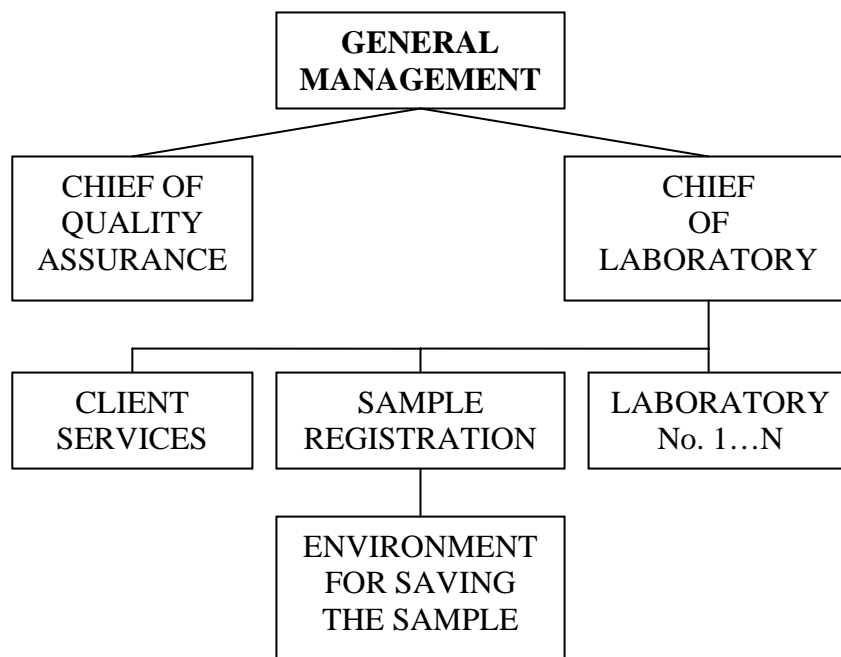


Figure 2: Organization scheme for analytical laboratory

In order to improve the effectiveness of the quality assurance system is needed to use frequently audits which may proceed from external specialist but shall proceed and internal periodical control to evaluate the effectiveness of the special analyst or special part of the laboratory [2,5].

The difficulties in establishment of quality system in chemical and physical laboratory must be different but we remember:

1. Management not sufficient
2. Time and sources that are needed in order to establish the quality system and to maintain with effectiveness by means of quality control.
3. Undervalue of the training for qualification and specialization.
4. Insufficiency of financial sources, quality of the devices and reagents are not in good conditions.
5. Deficiency of the reference materials and not good environmental condition of the work.

3. QUALITY CONTROL IN CHEMICAL AND PHYSICAL LABORATORY

Quality control in analytical laboratory realized by means of some manners:

- a. Quality control from statistical manner.
 - b. Internal control of quality in analytical laboratory
 - c. External control of quality by means of inter-laboratory comparisons.
- a. Statistical methods are used in order to improve the quality of the production and processes which includes the quality of chemical and physical analysis. Some of these instruments are shown in schematically manner below in example figures.

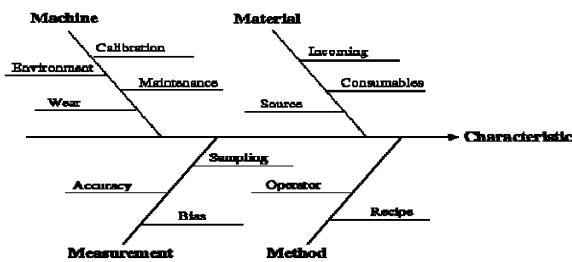


Figure 3: Diagram cause-effect

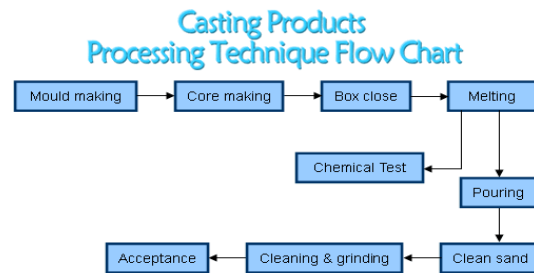


Figure 4: Flow chart

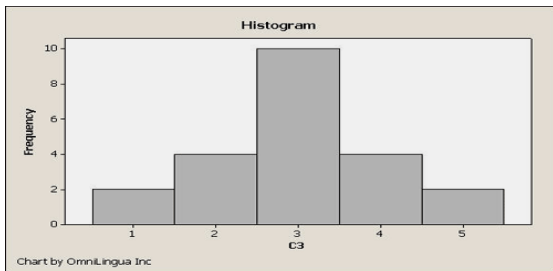


Figure 5: Histogram

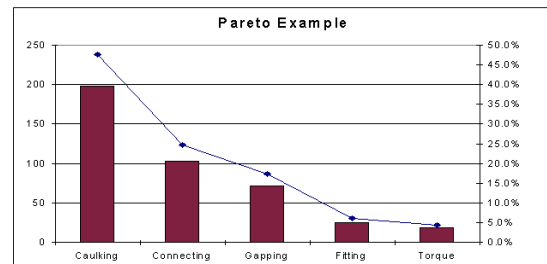


Figure 6: Diagram Pareto

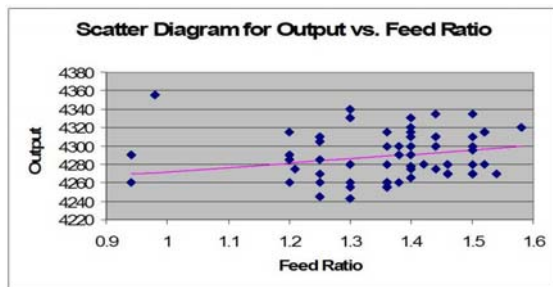


Figure 7: Correlation chart

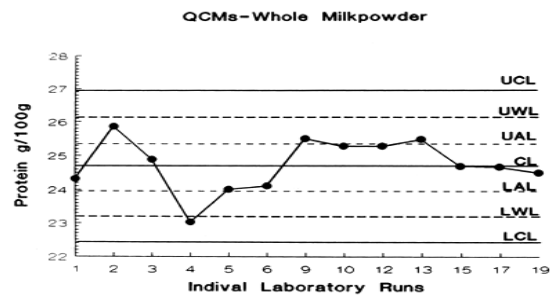


Figure 8: Control chart

b. An internal control of quality in analytical laboratory is composed by some components which are rank as below:

- Certification the competence of analyst – Before load the analyst to achieve analysis is better to prove the competence of analyst. Every time is needed from analyst to demonstrate the acceptance precision and no systematic errors during the analysis.
- Reclamation of the Supplement Standard Method – This is used when we want to analyze new matrices, to prove the interference of matrices. Supplement Standard of analytic should be 5 until 50 times higher than limit of detection but will be internal of the linear area from calibration curve.
- Analysis of the standard sample which is prepared outside the laboratory – In this case we have RM or CRM that are prepared outside the laboratory.
- Analysis of the white exhibit – It is needed that 5% of analyzed sample should be from white exhibit because is very important to control the purity of reagents and the other possible impurity in all work procedure.
- Evaluation of calibration – Standard calibration shall do every time that we want to do the analysis. Minimal number of standard calibration is 3. Recommended to verify every time the calibration curve for changes or not.
- Analysis of parallel exhibit – We can assess the determination precision from analysis of parallel exhibit.

c. External quality control in analytical laboratory has the general objective where the given results by different laboratory shall be comparing. This will realize by comparison laboratory. The laboratory attends comparison laboratory which analyze one or some identical homogeny sample in specify condition and assessment of the obtain results are shown in one unique report [4,5,6].

4. CONCLUSIONS

In the end of this study will say that if we know how to assurance and control the quality in analytical measurement we arrived in conclusion which is very important to solve the problems and to stop the technical barriers in different field for these reasons:

- Technological, economical, legislative, technology of the produce and environmental problems.
- Assurance that we give to consumer, healthy safeguard of the people and environmental protection.
- Growth of the product and service quality is one occurrence characteristic for nowadays which grow the role of analytical measurement in the life of the country.
- Including always in growing the number of the countries in International Economic and Trade which have basic requirement to realize the evaluation of the product and service in comparison between different countries.
- Different laboratory assurance to consumer analytical data with acceptance quality.

7. REFERENCES

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