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Review Article

Significance of Testing & Calibration and International Acceptance - a brief on Indian Scenarios

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Abstract

"Quality" means ensuring that products and services meet the requirements of the customers. Another way of understanding this approach to quality is that products and services should be fit for the purpose for which they are intended. For example, expensive leather shoes can be regarded as luxury products, but failing to meet the quality requirements of a farmer who really needs a pair of much less expensive rubber boots fit for his purpose of working in muddy fields. This understanding of quality as being fit for purpose and meeting customer requirements allows a Quality Infrastructure, which comprises Standardization, Metrology and Conformity Assessment (Testing and Calibration), to be used for producing effective results in meeting a broad range of challenges, in addition to product or service quality. Examples of particular interest to developing countries are food safety, health, environment, climate change, social responsibility and gender issues. The present paper briefly describes such issues with special reference to Indian quality infrastructure.

Global Scenario and Quality Infrastructure

With modern business becoming diversified, bigger and better, competition is higher than ever before. Therefore, it is incredibly important to ensure that a company is offering top range of the products to consumers to keep up pace and competition with its rivals. The one particular way by which companies can ensure the excellence in deliverables is performing rigorous quality checks before hand. Product testing and calibration are becoming more and more beneficial for the companies, specifically for start-up business units keen to get their name out in the open market and get it right from the beginning.

Not only for business, testing and calibration also play an important role for Government and Regulators to formulate the policies, to review and monitor the formulated policies and to plan for future. One of the greatest responsibilities of the regulators is to protect the health and safety of the public and the environment. Government and Regulators need to minimize the risk by using valid results from technically competent laboratories, inspection, certification, and verification bodies.

Operating in the public interest across all market sectors, accreditation determines the technical competence, reliability and integrity of conformity assessment bodies. There are organizations that check the conformity and the compliance with standards and regulations through testing, verification, inspection and calibration. Accreditation works through a process of transparent and impartial evaluation of these organizations against internationally recognized standards and other requirements. As an estimate, 80% of the world trade (USD 4 trillion annually) involves some level of conformity assessment {Source Organisation for Economic Co-operation and Development (OECD)} which, when used effectively, enhances the competitiveness by offering proof that products and services adhere to the requirements of the governments and the marketplace. It facilitates the international trade and contributes to the inclusive economic growth, access to opportunities for Small and Medium-sized Enterprises (SMEs), and a level playing field for developing economies. Accreditation can also be used to support the Government in policy making in different ways. For example, markets can 'self-regulate' through businesses voluntarily agreeing to meet the set standards. This can be also applied where there is a need to reassure markets on the conduct of business while minimizing risks, but where there is no desire by Government for regulatory intervention. For example, an industry or profession might choose to develop and adopt its own code of practice promoting ethical conduct. Government can encourage the use of standards to deliver policy, or indeed may wish to sponsor the creation of a standard for a particular purpose. Government might also work with an industry to develop a standard or code of practice or means of determining compliance that involves other

parties in setting standards and authorizing the activity. Accredited conformity assessment provides this assurance of compliance with such standards.

Internationally, Conformity Assessment Systems (including Accreditation) together with Metrology and Standards development constitute the pillars of National Quality Infrastructure (NQI). Quality infrastructure subsequently ensures that the products and processes meet the predefined specifications.

Quality Infrastructure was coined by the International Technical Cooperation, replacing the formerly used acronym MSTQ: "Quality infrastructure refers to all aspects of metrology, standardization, testing, quality management, certification and accreditation that have a bearing on conformity assessment (abbreviated as MSTQ)". The new designation is not only helpful in making the terminology easier to understand beyond the circles of experts, but it has also helped to embrace the systemic character of the Quality infrastructure.

As per Technical Barrier to Trade (TBT) Agreement, clause 6.1.1, accreditation is elaborated as "adequate and enduring technical competence of the relevant conformity assessment bodies in the exporting Member, so that confidence in the continued reliability of their conformity assessment results can exist; in this regard, verified compliance, for instance through accreditation, with relevant guides or recommendations issued by international standardizing bodies shall be taken into account as an indication of adequate technical competence". Having a product tested / inspected through an internationally recognized accredited laboratory adds value because it increases the speed at which goods pass through the border, ensures conformity assessment and such certificates are accepted on both sides of the border, thus reduces rejections of goods at the border, minimizes the opportunity cost, cuts trading costs for private sector, making them more sustainable. Moreover, due to the importance of testing and inspection, it is a fundamental requirement foreseen by the Trade Facilitation Agreement (TFA) TFA (Articles 5.3, 7, 8 and 12.1).

Testing, calibration and their accreditation activities thus help in i) National Government Authorities and Regulators - With confidence in the testing underpinned by accreditation, standards can be used to support a lighter lower monitoring to regulation, which in turn means that businesses spend less time tied up with bureaucracy; ii) Consumers - International accreditation agreements help increase the choice and range of goods and services available on the market and help to ensure that these meet relevant standards of quality and safety, whatever their country of origin and iii) Businesses - Holding accredited testing and calibration results show credible evidences of conformance with national and international standards and regulations which can differentiate a business from its competitors.

Indian Quality Infrastructure and Scenario

In India, the premier organizations responsible for Indian Quality Infrastructure are CSIR-National Physical Laboratory (CSIR-NPL) - the National Metrology Institute, Department of Weight and Measure (now Legal Metrology Department), Bureaus of Indian Standards and Quality Council of India (QCI). The quality infrastructure helps to achieve an essential pre -requisite of trade that any product or service is accepted formally in one economy must also be free to circulate in other economies without having to undergo extensive re-testing. Global sourcing of components calls for equivalence of measurement, which can be facilitated by a chain of accredited CABs. Accreditation is considered as the first essential step for facilitating mutual acceptance of test results and measurement data. The national measurement system (NMS) of India is defined as the technical and the organizational infrastructure, which ensures a consistent and internationally recognized basis for measurement. The NMS is required; i) to satisfy regulatory and other domestic requirement; ii) to improve and demonstrate the quality of products, iii) to reduce technical barriers to trade, iv) to facilitate international trade, and v) to recognize the key elements and to establish linkages with global measurement infrastructure.

Bureau of Indian Standards (BIS)

Erstwhile name Indian Standards Institution (ISI) was established in year 1947 with the objective of harmonious development of standardization activity in India. BIS as the National Standards Body of India has been participating in International Standardization activities and projecting India's interest during various stages of the development of International Standards. BIS is a founder member of International Organization for Standardization (ISO) and been actively participating in the activities of ISO and the International Electrotechnical Commission (IEC).

For formulation of Indian Standards, BIS functions through the Technical Committees, comprising of Sectional Committees, Subcommittees and panels of experts, set up for dealing with specific group of subjects. As a policy, the standards formulation activity of BIS has been harmonized as far as possible with the relevant guidelines as laid down by the International Organization for Standardization (ISO). BIS, being a signatory to the 'Code of Good Practice for the preparation, adoption and application of standards (Article 4 of WTO-TBT Agreement, Annex 3) has also aligned its standards formulation procedure accordingly. There are total 14 Divisions/Councils in BIS having 650 Technical Committees that have so far developed over 19000 Indian Standards. Over 350 new and revised standards are being formulated each year. A sizeable number of Indian Standards have been harmonized with ISO/IEC Standards to facilitate acceptance of Indian products in the International Market

Legal Metrology Departments (LMD) or Directorate of Weight and Measure (DW&M)

It is responsible for enforcement of standards, regulatory requirements of measurements and measuring instruments for the protection of health, public safety, the environment, enabling taxation, protection of consumers and fair trade in the country.

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CSIR-National Physical Laboratory (CSIR-NPL)

It is mandated to be India's "National Measurement Institute" (NMI) by an act of Parliament and associated rules framed by Legal Metrology Department. CSIR-NPL is the custodian of "National Standards" with a responsibility of realization, establishment, up gradation, maintenance and dissemination of standards at par to international level through R&D and latest technology. CSIR-NPL's National Metrology has not only championed in its primary mandate as the custodian of Measurement Standards for the nation but also served the Indian industry, academia and strategic sectors to excel in their endeavors. CSIR-NPL maintains international equivalence of its standards by way of Inter-comparison. CSIR-NPL, being NMI is the member of the "Metre Convention" and also the founder member of Asia-Pacific Metrology Programme (APMP). India is also a signatory of Mutual Recognition Arrangement (CIPM-MRA) of International Committee of Weights and Measures (CIPM). CSIR-NPL has the responsibility for maintaining the National Standards of Measurements, traceability of measurement through Bilateral/ International key comparisons and the Quality System as per International Standard ISO/IEC 17025:2005 (General requirements for the competence of testing and calibration laboratories). It represents India in CIPM - Mutual Recognition Arrangement of NMIs. CSIR-NPL's calibration and measurement capabilities (CMCs) are peer reviewed by international experts for mutual recognition. These CMCs are available in Appendix-C of MRA at http://kcdb.bipm.org/AppendixC/default.asp

Quality Council of India (QCI)

Through its constituent Boards, as fourth pillar of Quality infrastructure, is responsible for Conformity Assessment systems in the country. One of the boards, National Accreditation Board for Testing and Calibration Laboratories (NABL) is responsible for the accreditation of laboratories while another board National Accreditation Board for Certification Bodies (NABCB) is responsible for the accreditation of certification bodies. NABL was established with the objective of providing Government, Industry Associations and industries in general with a scheme of Conformity Assessment Body's accreditation which involves third-party assessment of the technical competence of testing including medical and calibration laboratories, proficiency testing providers and reference material producers. NABL grants accreditation covering almost all scope of science and technology. The accreditation to testing laboratories is provided as per international standard ISO/IEC 17025. NABL has established its accreditation system in accordance with ISO/ IEC 17011: 2004 'Conformity Assessment – General requirements for Accreditation bodies accrediting conformity assessment bodies'. NABL is a signatory to International Laboratory Accreditation Co-operation (ILAC) as well as Asia Pacific Laboratory Accreditation Co-operation (APLAC) Mutual Recognition Arrangements (MRA) for accreditation of Testing including Medical and Calibration laboratories, which is based on mutual evaluation and acceptance of other MRA Partner accreditation systems. NABL is also having APLAC Mutual Recognition Arrangements (MRA) for Proficiency Testing Provider & Reference materials producers. Such international arrangements facilitate acceptance of test / calibration results between countries which MRA partners represent.

Conclusion

The national and international systems of measurements and quality infrastructure are briefly described. The nations having well established and trusted National Quality Infrastructure enjoy a host of benefits including greater participation in global trade, economic development and greater prosperity. The knowledge from standards and measurement techniques enable more innovation and product development which enhances the domestic commercial activity and consumer protection. It may be concluded that a well-established quality infrastructure in any country is a must as it provides a win-win situation for the stakeholders.