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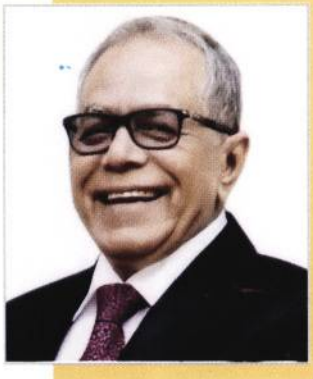
রাষ্ট্রপতি
গণপ্রজাতন্ত্রী বাংলাদেশ
বঙ্গভবন, ঢাকা।
২৬ জ্যৈষ্ঠ ১৪২৫
০৯ জুন ২০১৮



বাণী

বাংলাদেশ এ্যাক্রেডিটেশন বোর্ড (বিএবি) প্রতি বছরের ন্যায় এবারও 'বিশ্ব এ্যাক্রেডিটেশন দিবস-২০১৮' পালন করছে জেনে আমি আনন্দিত।

জীবন ধারণের জন্য প্রতিটি ধাপে বিশেষ করে কর্মস্থল, পণ্যসামগ্রি, যোগাযোগ ব্যবস্থা, খাদ্যসহ সর্বস্তরে নিরাপত্তা একটি বৈশ্বিক প্রত্যাশা। কিন্তু প্রায়োগিক ক্ষেত্রে প্রত্যাশা ও প্রাপ্তির মধ্যে অনেক ক্ষেত্রে পার্থক্য লক্ষ্য করা যায়। মান, সাযুজ্য নিরুপণ ও এ্যাক্রেডিটেশন হচ্ছে এমন একটি ব্যবস্থা যার মাধ্যমে সর্বক্ষেত্রে নিরাপত্তা নিশ্চিত করা সম্ভব। বিশ্বের বিভিন্ন দেশ এ নিয়ামকসমূহকে কাজে লাগিয়ে তাদের জীবন ব্যবস্থাকে বেশ উন্নত রাখতে সক্ষম হয়েছে। এ প্রেক্ষিতে বিশ্ব এ্যাক্রেডিটেশন দিবসে এ বছরের প্রতিপাদ্য- "Accreditation: Delivering a Safer World"- যথার্থ বলে আমি মনে করি।

রূপকল্প ২০২১ ও ২০৪১ কে সামনে রেখে বর্তমান সরকার ব্যাপক কার্যক্রম বাস্তবায়ন করছে। আমাদের লক্ষ্য বাংলাদেশকে ২০২১ সালের মধ্যে মধ্য আয়ের ও ২০৪১ সালের মধ্যে উন্নত দেশে পরিণত করা। এরই ধারাবাহিকতায় আমরা ইতোমধ্যে নিম্ন মধ্য আয়ের দেশে পরিণত হওয়ার পাশাপাশি পেয়েছি স্বল্পোন্নত থেকে উন্নয়নশীল দেশে পদার্পণের স্বীকৃতি। উন্নত দেশের স্বীকৃতি পেতে আমাদের অর্থনৈতিক উন্নয়নের সাথে সাথে জীবনযাত্রার মনোন্নয়নেও সচেষ্ট থাকতে হবে। এ ক্ষেত্রে সরকার, নিয়ন্ত্রক সংস্থা ও ব্যবসায়িক সম্প্রদায়সহ সংশ্লিষ্ট সকলের সমন্বিত উদ্যোগ অত্যন্ত জরুরি। ভবিষ্যৎ প্রজন্মের জন্য একটি সুন্দর ও নিরাপদ পৃথিবী তৈরিতে সকলে সচেষ্ট থাকবে- এ প্রত্যাশা করি।

আমি 'বিশ্ব এ্যাক্রেডিটেশন দিবস-২০১৮' উপলক্ষে আয়োজিত সকল কর্মসূচির সার্বিক সফলতা কামনা করি।

খোদা হাফেজ, বাংলাদেশ চিরজীবী হোক।

মোঃ আবদুল হামিদ

بسم الله الرحمن الرحيم

প্রধানমন্ত্রী
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
২৬ জ্যৈষ্ঠ ১৪২৫
০৯ জুন ২০১৮

বাণী

'বিশ্ব এ্যাক্রেডিটেশন দিবস ২০১৮' উপলক্ষে আমি বাংলাদেশ এ্যাক্রেডিটেশন বোর্ডসহ সকল অংশীজন এবং উন্নয়ন সহযোগী সংস্থাকে আন্তরিক শুভেচ্ছা জানাচ্ছি। দিবসটির এবারের প্রতিপাদ্য 'Accreditation: Delivering a Safer World' সময়োপযোগী হয়েছে বলে আমি মনে করি।

সকলেরই প্রত্যাশা থাকে আমরা প্রতিদিন যে পণ্য বা সেবা গ্রহণ করি তা হবে নিরাপদ। নিরাপদ পৃথিবী গড়ে তোলা এখন সময়ের দাবি এবং একটি বড় চ্যালেঞ্জ। তাই এ উদ্যোগ বাস্তবায়নের লক্ষ্যে পারস্পরিক অংশীদারিত্বের ভিত্তিতে সম্মিলিতভাবে সকলকে এগিয়ে আসতে হবে ।

আমরা ২০২১ সালে মহান স্বাধীনতার সুবর্ণজয়ন্তীতে বাংলাদেশকে মধ্যম আয়ের এবং ২০৪১ সালের মধ্যে উন্নত-সমৃদ্ধ দেশে পরিণত করব, ইনশাআল্লাহ। বাংলাদেশ ইতোমধ্যেই স্বল্পোন্নত দেশ থেকে উন্নয়নশীল দেশে উন্নীত হয়েছে। জাতিসংঘ ঘোষিত 'টেকসই উন্নয়ন অভীষ্ট' বাস্তবায়নে আমরা প্রয়োজনীয় পদক্ষেপ গ্রহণ করেছি। সকলের জন্য নিরাপদ কর্মপরিবেশ নিশ্চিতকরণ, পরিবেশ দূষণ কমিয়ে আনা, নিরাপদ খাদ্য ব্যবস্থাপনা প্রতিষ্ঠা, গুণগত মানসম্পন্ন জীবনরক্ষাকারী ঔষধ উৎপাদন ও সরবরাহের মত জনগুরুত্বপূর্ণ বিভিন্ন কার্যক্রম বাস্তবায়নের লক্ষ্যে আমাদের সরকার নিরলসভাবে কাজ করে যাচ্ছে।

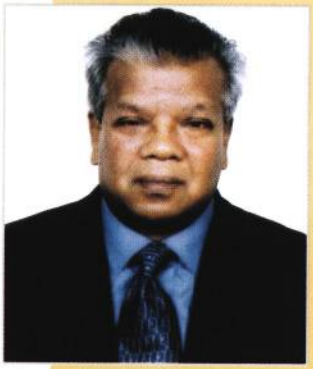
আমি আশা করি, বাংলাদেশ এ্যাক্রেডিটেশন বোর্ড (বিএবি) জাতীয় অবকাঠামো উন্নয়ন, নিরাপদ পণ্য ও সেবার মান নিশ্চিতকরণের মাধ্যমে ভোক্তা অধিকার প্রতিষ্ঠায় সহায়তাসহ জীবনযাত্রার মানোন্নয়নে আরও তাৎপর্যপূর্ণ ভূমিকা রাখবে।

আমি 'বিশ্ব এ্যাক্রেডিটেশন দিবস ২০১৮'- এর সার্বিক সাফল্য কামনা করছি।

জয় বাংলা, জয় বঙ্গবন্ধু
বাংলাদেশ চিরজীবী হোক।

শেখ হাসিনা

মন্ত্রী
শিল্প মন্ত্রণালয়
২৬ জ্যৈষ্ঠ ১৪২৫
০৯ জুন ২০১৮



বাণী

বাংলাদেশ এ্যাক্রেডিটেশন বোর্ডের (বিএবি) উদ্যোগে ৯ জুন **"বিশ্ব এ্যাক্রেডিটেশন দিবস ২০১৮"** উদ্‌যাপন করা হচ্ছে জেনে আমি আনন্দিত। এ মহতী উদ্যোগের জন্য আমি বিএবি'র কর্মকর্তা-কর্মচারীদের আন্তরিক অভিনন্দন জানাই।

এ বছর বিশ্ব এ্যাক্রেডিটেশন দিবসের প্রতিপাদ্য বিষয় নির্ধারণ করা হয়েছে, "Accreditation: Delivering a Safer World"। এতে বিশ্বব্যাপী নিরাপদ আবাসন, কর্মস্থল, যাত্রী পরিবহণ, খাদ্য, স্বাস্থ্য, পোশাক ও পরিবেশসহ মানুষের জীবনঘনিষ্ঠ সকল বিষয়ে সর্বোচ্চ নিরাপত্তা জোরদারের ওপর গুরুত্ব দেয়া হয়েছে। জ্ঞানভিত্তিক ও পরিবেশবান্ধব শিল্পায়নের প্রেক্ষাপটে বাংলাদেশের জন্য প্রতিপাদ্য বিষয়টি অত্যন্ত তাৎপর্যপূর্ণ। এর মাধ্যমে আমাদের শিল্প কারখানায় কর্মরত শ্রমিক-কর্মচারীদের নিরাপত্তা জোরদার হবে। পাশাপাশি পেশাজীবীদের জন্য নিরাপদ কর্মস্থল এবং সকল নাগরিকের জন্য নিরাপদ খাদ্য, বস্ত্র, পরিবহণ, শিক্ষা, চিকিৎসা, বিনোদন ব্যবস্থা গড়ে তোলার বিষয়ে জনসচেতনতা বাড়বে বলে আমার বিশ্বাস।

নিরাপদ বিশ্ব গড়ে তোলার জন্য নিরাপদ অবকাঠামো ও উৎপাদন পরিবেশের বিকল্প নেই। এক্ষেত্রে এ্যাক্রেডিটেশন একটি গুরুত্বপূর্ণ হাতিয়ার। এ্যাক্রেডিটেশন ব্যবস্থা মানুষের জন্ম থেকে মৃত্যু পর্যন্ত যা কিছু প্রয়োজন, তার সবই নিরাপদ ও স্বাস্থ্যসম্মতভাবে তৈরির নিশ্চয়তা বিধান করে। এটি উৎপাদন ব্যবস্থাপনায় বিশ্বব্যাপী স্বীকৃত মান অনুসরণ নিশ্চিত করে। ফলে জননিরাপত্তা জোরদার হয়, সুষম ও দক্ষ বাজার ব্যবস্থা গড়ে ওঠে এবং পরিবেশবান্ধব শিল্পায়নের ধারা বেগবান হয়। এ ব্যবস্থা সাধারণ নাগরিক, সরকার, নীতি নির্ধারক, উৎপাদক, বাজারজাতকারীসহ সংশ্লিষ্ট সকলের মধ্যে গুণগত মানবিষয়ক আস্থা ও দায়িত্বশীলতার মনোভাব তৈরি করে। ব্যক্তি থেকে জাতীয় পর্যায়ে গড়ে ওঠা এ ধরনের দায়িত্বশীল চেতনা ও মূল্যবোধ সামগ্রিকভাবে একটি নিরাপদ বিশ্ব গড়ে তুলতে ইতিবাচক অবদান রাখে।

আমার বিশ্বাস, এবারের বিশ্ব এ্যাক্রেডিটেশন দিবস উদ্‌যাপনের মাধ্যমে বাংলাদেশের শিল্প-কারখানায় নিরাপদ ও পরিবেশবান্ধব পণ্য উৎপাদনের প্রয়াস জোরদার হবে। একই সাথে উৎপাদন ও ব্যবস্থাপনার সাথে সংশ্লিষ্ট সকলের মধ্যে গুণগতমান ও মানব দেহের নিরাপত্তা বিষয়ক সচেতনতা বাড়বে। নিরাপত্তা বিষয়ক এ ধরনের সচেতনতা ও ইতিবাচক দৃষ্টিভঙ্গির ধারা অব্যাহত রেখে আমরা ২০২১ সালের মধ্যে শিল্প সমৃদ্ধ মধ্যম আয়ের, ২০৩০ সাল নাগাদ এসডিজি লক্ষ্য অর্জন এবং ২০৪১ সালের মধ্যে উন্নত বাংলাদেশ বিনির্মাণের কাঙ্খিত গন্তব্যের পথে এগিয়ে যেতে সক্ষম হবো।

আমি বিশ্ব এ্যাক্রেডিটেশন দিবস উপলক্ষে বিএবি আয়োজিত অনুষ্ঠানের সাফল্য কামনা করছি।

আমির হোসেন আমু, এম.পি

সচিব
শিল্প মন্ত্রণালয়
২৬ জ্যৈষ্ঠ ১৪২৫
০৯ জুন ২০১৮

বাণী

সারা বিশ্বের ন্যায় বাংলাদেশেও বাংলাদেশ এ্যাক্রেডিটেশন বোর্ড (বিএবি) ০৯ জুন **"বিশ্ব এ্যাক্রেডিটেশন দিবস-২০১৮"** নানা কর্মসূচির মধ্য দিয়ে উদযাপন করছে জেনে আমি আনন্দিত।

এ্যাক্রেডিটেশন একটি বৈশ্বিক ব্যবস্থা। প্রতিযোগিতামূলক বর্তমান বিশ্ববাজারে বাণিজ্যের প্রসার, ভোক্তাদের মাঝে সচেতনতা সৃষ্টি ও আস্থা বৃদ্ধি করতে এ্যাক্রেডিটেশন একটি অপরিহার্য নিয়ামক। শুধু বিশ্ববাণিজ্যে কারিগরি প্রতিবন্ধকতা দূরীকরণেই নয়, বিশ্বব্যাপি নিরাপদ আবাসন, নিরাপদ কর্মক্ষেত্র, নিরাপদ পরিবেশ, নিরাপদ খাদ্য, নিরাপদ স্বাস্থ্য, নিরাপদ পোশাক, নিরাপদ যানবাহন, ইত্যাদি ক্ষেত্রে সুনিশ্চয়তা ও সুরক্ষা প্রদানে এ্যাক্রেডিটেশন অত্যন্ত গুরুত্বপূর্ণ ভূমিকা পালন করে থাকে। কাজেই এ বছর বিশ্ব এ্যাক্রেডিটেশন দিবসের প্রতিপাদ্য "Accreditation: Delivering a Safer World" তাৎপর্যপূর্ণ হয়েছে বলে আমি মনে করি। নিরাপদ বিশ্ব গড়ে তুলতে এবারের প্রতিপাদ্য যুগোপযোগী।

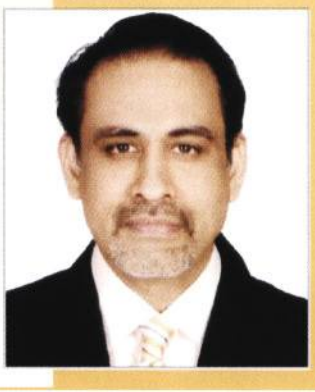
সময়ের সাথে চাহিদার পরিপ্রেক্ষিতে প্রতিনিয়ত পরিবর্তিত হচ্ছে আমাদের জীবন ব্যবস্থা। ডিজিটালাইজেশনের ফলে অত্যাধুনিক ও বহুমাত্রিক প্রযুক্তির ব্যবহার আমাদের প্রাত্যহিক জীবনের একটি অনুষঙ্গ হয়ে উঠেছে। ফলে একদিকে যেমন জীবনে এসেছে উন্নত সুবিধা ও গতিশীলতা, অপরদিকে তেমনি বৃদ্ধি পেয়েছে নিরাপত্তাহীনতা ও ঝুঁকি। এ ধরনের সমস্যা এখন আর কোন নির্দিষ্ট ভূখণ্ডে সীমাবদ্ধ নেই, বৈশ্বিক সমস্যায় রূপ নিয়েছে। তাই সাযুজ্য নিরুপণ ব্যবস্থা ও এ্যাক্রেডিটেশন এসব সমস্যা দূরীকরণ কিংবা হ্রাসের মাধ্যমে নিরাপদ বিশ্ব বিনির্মাণে জোরালো ভূমিকা রাখে। এবারের বিশ্ব এ্যাক্রেডিটেশন দিবস উদযাপন এ বিষয়ে জনসচেতনতা সৃষ্টিতে গুরুত্বপূর্ণ অবদান রাখবে বলে আমি বিশ্বাস করি।

আমি 'বিশ্ব এ্যাক্রেডিটেশন দিবস-২০১৮' এর সাফল্য কামনা করছি।

মোহাম্মদ আব্দুল্লাহ্

সভাপতি
ঢাকা চেম্বার অব কমার্স অ্যান্ড ইন্ডাস্ট্রি
(ডিসিসিআই)
২৬ জ্যৈষ্ঠ ১৪২৫
০৯ জুন ২০১৮

DCCI
ঢাকা চেম্বার অব কমার্স অ্যান্ড ইন্ডাস্ট্রি



বাণী

বাংলাদেশ এ্যাক্রেডিটেশন বোর্ড (বিএবি) আগামী ০৯ জুন, ২০১৮ তারিখ বিশ্ব এ্যাক্রেডিটেশন দিবস উদ্‌যাপন করতে যাচ্ছে জেনে আমি অত্যন্ত আনন্দিত।

এবারের বিশ্ব এ্যাক্রেডিটেশন দিবস ২০১৮ এর মূল প্রতিপাদ্য বিষয় হচ্ছেঃ "Accreditation: delivering a safer world". এবারের প্রতিপাদ্য বিষয়টি অত্যন্ত সময়োপযোগী ও গুরুত্বপূর্ণ বলে আমি মনে করি। একটি নিরাপদ বিশ্ব গড়তে আমাদের সকলকে একসাথে কাজ করে যেতে হবে। কর্মক্ষেত্রে একজন কর্মকর্তা বা কর্মচারী যেন নিরাপদ ও স্বাস্থ্যকর একটি কর্মপরিবেশ পায় সেদিকে খেয়াল রাখতে হবে। একটি নিরাপদ কর্মপরিবেশ শুধুমাত্র একটি নিয়মতান্ত্রিক বাধ্যবাধকতাই নয় বরং তা পণ্যের মূল্য হ্রাস, কর্মকর্তা/কর্মচারীদের অধিকতর কর্মচাঞ্চল্য, দুর্ঘটনা লাঘব এবং সর্বোপরি উৎপাদনশীলতা বৃদ্ধিতে সহায়তা করে থাকে।

এ্যাক্রেডিটেশন যে শুধুমাত্র ব্যবসায় আভ্যন্তরীণ কর্মপন্থা মূল্যায়ন ও নিয়ন্ত্রণে বিশ্বব্যাপি স্বীকৃত একটি পদ্ধতি তাই নয় বরং এ্যাক্রেডিটেশন পণ্য ও সেবার মান নিয়ন্ত্রণে ভূমিকা রেখে থাকে। এভাবে নীতিনির্ধারক, ক্রেতা ও কর্মকর্তা কর্মচারীগণ আত্মবিশ্বাস পায় যে এ্যাক্রেডিটেশন একটি নিরাপদ বিশ্ব গড়তে সাহায্য করে। যে সকল প্রতিষ্ঠানসমূহ পেশাগত স্বাস্থ্য ও নিরাপত্তা ব্যবস্থাপনা মান অগ্রাধিকার ভিত্তিতে মেনে চলে তা স্পষ্টত এটাই ইঙ্গিত করে যে সে সকল প্রতিষ্ঠানসমূহ কর্মকর্তা/কর্মচারীদের স্বাস্থ্য ও নিরাপত্তার বিষয়টিকে প্রাধান্য দিয়ে থাকে। এ্যাক্রেডিটেশন প্রতিষ্ঠানে ঝুঁকি চিহ্নিতকরণ ও নিরাপদ কর্মপরিবেশ নিশ্চিতে সহায়তা করে। এ্যাক্রেডিটেশন বাজার পৃথকীকরণে সহায়তা করে থাকে এবং পণ্যের নিরাপত্তা প্রদানে সহায়তা প্রদান করে।

প্রতিবছরে ন্যায় এ বছরও ঢাকা চেম্বার অব কমার্স অ্যান্ড ইন্ডাস্ট্রি (ডিসিসিআই) এর সাথে যৌথভাবে বিশ্ব এ্যাক্রেডিটেশন দিবস ২০১৮ উদযাপনের সিদ্ধান্ত গ্রহণের জন্য বাংলাদেশ এ্যাক্রেডিটেশন বোর্ডকে আন্তরিক ধন্যবাদ জানাচ্ছি এবং দিবসটির সাফল্য কামনা করছি।

আবুল কাসেম খান

মহাপরিচালক
(অতিরিক্ত সচিব)
বাংলাদেশ এ্যাক্রেডিটেশন বোর্ড (বিএবি)
২৬ জ্যৈষ্ঠ ১৪২৫
০৯ জুন ২০১৮

জাতীয় মান অবকাঠামো উন্নয়নে বিএবি'র ভূমিকা

জাতীয় মান অবকাঠামো (Quality Infrastructure) ও সাযুজ্য নিরুপণ পদ্ধতি (Conformity Assessment System) প্রতিষ্ঠার মাধ্যমে পণ্য ও সেবার গুণগত মান নিশ্চিতকরণের লক্ষ্যে বাংলাদেশ এ্যাক্রেডিটেশন আইন, ২০০৬ অনুযায়ী প্রতিষ্ঠিত হয় বাংলাদেশ এ্যাক্রেডিটেশন বোর্ড (বিএবি)।

দেশে উৎপাদিত ও আমদানীকৃত পণ্য ও সেবার গ্রহণযোগ্যতা নিশ্চিত করে দেশীয় বাজারে ভোক্তা আস্থা বৃদ্ধি ও জনস্বার্থ নিশ্চিত করা এবং দেশীয় পণ্য ও সেবার রপ্তানি বাজার সম্প্রসারিত করার জন্য একটি কার্যকর ও শক্তিশালী মান অবকাঠামো প্রয়োজন। এ্যাক্রেডিটেশন হ'ল এর প্রধানতম এবং বিশ্বব্যাপী গ্রহণযোগ্য ব্যবস্থা যা সাযুজ্য নিরুপণকারী প্রতিষ্ঠান যথা- পরীক্ষাগার, সনদ প্রদানকারী ও পরিদর্শন সংস্থাসমূহকে আন্তর্জাতিক মান অনুসারে স্বীকৃতি প্রদান করে। এ্যাক্রেডিটেশন এর সাথে মান অবকাঠামোর অপর ব্যবস্থাগুলো তথা মান নির্ধারণ (Standardization), পরিমাপবিদ্যা (Metrology) ও সাযুজ্য নিরুপণ (Conformity Assessment) ওতোপ্রতোভাবে জড়িত।

আজ এ্যাক্রেডিটেশন অর্থনৈতিক সমৃদ্ধি ও বিশ্ব বাণিজ্যের উন্নতির হাতিয়ার হিসেবে বিশ্বব্যাপি বিশেষভাবে পরিগণিত হচ্ছে। আর এ্যাক্রেডিটেশন ব্যবস্থা সুসংহত করার মূল চাবিকাঠি একটি দেশের সর্বস্তরের জনগণের মাঝে আস্থা স্থাপন। জনগণের মাঝে আস্থা তৈরির মূল নিয়ামক হলো মান অবকাঠামোগত উন্নয়ন। নিরাপদ খাদ্য, নিরাপদ বাসস্থান, নিরাপদ বস্ত্র, নিরাপদ স্বাস্থ্যসেবা, নিরাপদ যানবাহন, নিরাপদ কর্মস্থল ও সর্বোপরি নিরাপদ পরিবেশ গড়ে তুললেই অর্জিত হবে জনগণের আস্থা এবং রক্ষিত হবে বৃহৎ জনস্বার্থ।

তাই এবারের এ্যাক্রেডিটেশন দিবসের মূল প্রতিপাদ্য হলো- Accreditation: delivering a safer world নিরাপদ একটি বিশ্ব গড়ে তোলার প্রত্যয় নিয়ে বিএবি প্রথমে নিশ্চিত করতে চায় নিরাপদ বাংলাদেশ। এ ক্ষেত্রে জীবনের সর্বস্তরে প্রয়োজনীয় উপকরণগুলোর গুণগত মান নিশ্চিতকরণে এ্যাক্রেডিটেশনকে গুরুত্বপূর্ণ পন্থা হিসেবে বাস্তবায়ন অত্যন্ত জরুরি হয়ে পড়েছে।

যদিও এ্যাক্রেডিটেশনের ধারণা বাংলাদেশে নতুন। বিএবি'র সম্মানিত ভারপ্রাপ্ত চেয়ারম্যান ও সদস্যদের দূরদৃষ্টি ও সুচারু দিক নির্দেশনায় এবং বিএবি'র অব্যাহত প্রচেষ্টা ও পেশাদারিত্বের ফলে এ্যাক্রেডিটেশন ধীরে ধীরে দেশ-বান্ধব বিষয় হিসেবে পরিচিতি লাভ করছে। ফলে ভোক্তা আস্থা নিশ্চিতকরণ ও রপ্তানি বাণিজ্য সম্প্রসারণের পাশাপাশি সরকার ও নিয়ন্ত্রক সংস্থাগুলোর আস্থার ভাগিদার হতে যাচ্ছে এ্যাক্রেডিটেশন। বিএবি এ যাবত ৪৮টি টেস্টিং, ৬টি ক্যালিব্রেশন, ২টি মেডিকেল টেস্টিং, ২টি সনদ প্রদানকারী সংস্থা ও ২টি পরিদর্শন সংস্থাকে এ্যাক্রেডিটেশন সনদ প্রদান করেছে। দেশের বৃহত্তর চাহিদা মেটাতে নানা ক্ষেত্রে এ্যাক্রেডিটেশনের ব্যাপ্তি নিশ্চিত করতে বিএবি দৃঢ় সংকল্পে কাজ করে চলেছে।

মোঃ মনোয়ারুল ইসলাম

Contents

Joint Statement

by **Xiao Jianhua,** Chair IAF, and **Merih Malmqvist Nilsson,** Chair ILAC

Xiao Jianhua

World Accreditation Day 2018 (#WAD2018)

Accreditation: Delivering a Safer World

Merih Malmqvist Nilsson

World Accreditation Day 2018 focuses on how accreditation delivers a safer world.

The expectation of safe workplaces, safe products, safe transport, safe food, in fact all aspects of our lives is universally shared. Statistics however show that the expectation is not being matched by the reality. Closing this gap is a vital consideration for government, regulators and businesses, aiming to keep people safer in their work, their domestic life, their journeys and all other parts of their lives.

Standards, conformity assessment and accreditation are well-established and accepted tools that are used to help deliver a safer world. Examples of the use of these tools include: life guards having accredited certification in Dubai; asbestos testing at accredited laboratories in the UK; certification for adventure tourism activities in New Zealand; accredited certification in the Czech Republic for electronic tool workers; accredited inspection for public lifts in the Netherlands.

One of the most significant endorsements of the benefits of conformity assessment is with an Italian insurer. By analysing the rates of work-place accidents between organisations who have certification to the OHSAS 18001 Health & Safety management system standard and those without it, the insurer offers significantly lower insurance premiums to those certified to the standard as they see those with the certification as a much lower risk.

The use of management systems to help reduce health & safety risks will be considerably expanded in March 2018 with the publication of the first ISO Health & Safety management system standard, ISO 45001, designed to improve organisations' health & safety performance by recognising the risks and developing objectives, policies, processes and controls to minimise these risks.

Another clear example of how accreditation delivers a safer world is through the Dutch criminal justice system, where DNA evidence will only be admissible if the DNA testing has been conducted by a laboratory accredited to ISO/IEC 17025. By having the DNA testing in a laboratory that is accredited by an ILAC Mutual Recognition Arrangement (MRA) signatory, this ensures that the judicial system in upheld, and that citizens are consistently protected.

These examples provide a very brief introduction to the vast range of ways accreditation, conformity assessment and standards can deliver a safer world. Completed projects, raw materials, products, processes, services, management systems, and persons can be evaluated against a standard, code of practice, or regulatory requirement by testing and calibration laboratories, inspection bodies, certification bodies and validation & verification bodies (collectively known as Conformity Assessment Bodies). Conformity assessment bodies are used to check that products and services are safe for use.

Accreditation is the independent evaluation of these conformity assessment bodies against recognised standards to carry out specific activities to ensure their integrity, impartiality and competence. Through the application of national and international standards, government, businesses and wider society can therefore have confidence in the calibration and test results, inspection reports and certifications provided, delivering both increased confidence and safer practices.

World Accreditation Day 2018 provides an excellent opportunity to explore how accreditation can deliver a safer world and for businesses, government and regulators to find standards, conformity assessment and accreditation tools to help them in this goal. A brochure giving more details of how accreditation delivers a safer world is available for download from the IAF and ILAC websites.

Major events, press and television coverage, workshops and seminars will take place in conjunction with the celebration of World Accreditation Day in over 100 countries to raise awareness of the value that accreditation plays in supporting a safer world. For further details, contact your local accreditation body using ILAC's MRA signatory search at **http://ilac.org/signatory-search/** and the IAFs' directory at: **http://www.iaf.nu//articles/IAF_MEMBERS_SIGNATORIES/4**

Additional case studies, research and support material is available at **http://www.publicsectorassurance.org/topic-areas/health-safety/**

Accreditation: Delivering a Safer World

9 June marks **World Accreditation Day**, a global initiative, jointly established by IAF and ILAC, to raise awareness of the importance of accreditation. The theme of World Accreditation Day 2018 focuses on how accreditation delivers a safer world.

What are the issues?

There are more than 2.78 million deaths per year as a result of occupational accidents or work-related diseases. Approximately 125 million people in the world are exposed to asbestos – in the workplace, resulting in an estimate of several thousand deaths from asbestos-related lung cancer each year. One in eight of total global deaths, around 7 million people annually died as a result of air pollution exposure, and there were 1.25 million recorded road traffic deaths globally in 2013[1]. There are also 374 million non-fatal work-related injuries and illnesses each year, many of these resulting in extended absences from work. Aside from the significant human cost, the economic impact of poor occupational safety and health practices is estimated to be 3.94% of global Gross Domestic Product (or about US$2.8 trillion, in direct and indirect costs of injuries and diseases) each year[2].

Recent problems with tainted food, drugs, electronic devices and other consumer products have made clear that more needs to be done to protect consumers. Injury statistics indicate that design problems, defects and inadequate safety information for consumer products are associated with many injuries.

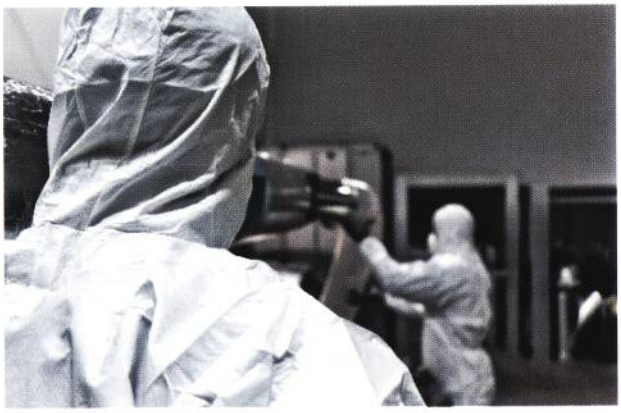
In wider society, we expect that products we buy, from electrical goods to children's toys, our environment (water without contaminants, air free from harmful pollutants) or large-scale infrastructure projects (such as road, bridges, and public transportation systems) are safe to use. Our daily sources of energy, such as gas or electricity, should also be accessible without risk of injury or harm. Basic services such as drinking water and medical tests should be relied upon.

Businesses have a responsibility to ensure that their employees, visitors, and customers are able to enjoy freedom from injury or disease. They should also ensure that they provide for a sense of mental, physical and social wellbeing.

Health and Safety Regulation varies from country to country. In some economies, there are severe penalties for workplace accidents or breaches in policy. In other countries, economic development policies are of a higher strategic importance. Some businesses may feel that they face a challenge in balancing health and safety with operational needs, while others may feel pressured into focusing on profitability.

Providing a safe working environment should not be seen as a regulatory burden, but as a way to:

- reduce costs
- lower employee absence and turnover rates
- suffer fewer accidents
- lessen the threat of legal action
- protect reputation for corporate responsibility among investors and customers
- increase productivity through a healthier and better motivated workforce



[1] Source: World Health Organisation
[2] Source: International Labour Organization

What is the role of accreditation?

Completed projects, raw materials, products, services, management systems, and/or personnel can be evaluated against a standard, code of practice, or regulatory requirement by testing and calibration laboratories, inspection bodies and certification bodies (collectively known as conformity assessment bodies). Conformity assessment bodies are used to check that products and services are safe for use.

Accreditation is the independent evaluation of these conformity assessment bodies against recognised standards to carry out specific activities to ensure their integrity, impartiality and competence. Through the application of national and international standards, government departments, businesses and wider society can therefore have confidence in the calibration and test results, inspection reports and certifications provided. Accreditation bodies are established to ensure that conformity assessment bodies are subject to oversight by a competent body. Internationally recognised accreditation bodies, which have been evaluated by peers as competent, sign international arrangements that enhance the acceptance of products and services across borders, thereby creating a global infrastructure to support health and safety related processes.

These arrangements are managed by IAF, covering accreditation of certification bodies and verification/validation bodies, and ILAC, in the areas of testing, calibration and inspection body accreditation. This system ensures that the accreditations issued by different accreditation bodies is consistent across the globe. As a result, products and services tested, inspected or certified once under the IAF and ILAC umbrella, can be accepted everywhere with equal confidence.

What benefit does accreditation provide?

For Government & Regulators

The role of Government and Regulatory bodies is to ensure that businesses provide a safe working environment. They can set policy or technical requirements for products or services that are placed in the market, and rely on accredited conformity assessment bodies to verify compliance with those requirements.

Accreditation can be used to support health and safety policy in different ways. For example, markets can 'self-regulate' through businesses voluntarily agreeing to meet set standards. This can be applied where there is a need to reassure markets on the conduct of business while minimising risks, but where there is no desire by Government for regulatory intervention.

Alternatively, businesses that demonstrate compliance with standards through accreditation may earn 'recognition' from regulators, who trust them to comply with their legal obligations. This enables regulators to reduce oversight and inspection visits, saving tax payers money. This 'Earned recognition' can achieve the same or better outcomes as regulation, but on a voluntary basis. In this way, the cost of regulation is reduced for both the government and the regulated business.

International accreditation arrangements provide Regulators with a robust and credible framework to accept accredited test results, inspection reports and certifications from overseas, with an equivalent level of confidence as if they were carried out in the local economy.

Examples of how regulators are using accreditation to support their health and safety policy objectives can be found on Public Sector Assurance at **http://www.publicsectorassurance.org/topic-areas/health-safety/**

What benefit does accreditation provide? *continued*

For Government & Regulators

Case Studies:

Underpinning the competence of lifeguards in Dubai

Dubai has beaches, hotel pools, residential & sports complexes, and water parks that are under the supervision of thousands of lifeguards.

The Public Health & Safety Department of Dubai Municipality uses the accredited certification of lifeguards as a measure to create a safer experience for tourists. The scheme uses ISO 17024 and covers the certification of pool lifeguards, shallow water lifeguards and beach lifeguards.

The scheme assesses lifeguards for water rescue and basic first aid skills. After successfully completing examinations and certification requirements, the lifeguards receive a certificate and card from an accredited provider.

Czech Ministry of Regional Development requires certification of electronic tools users

Accredited certification is used by the Ministry of Regional Development of the Czech Republic to assess the professional competence of those that use electronic tools or carry out operations using electronic equipment. Accredited certification is required through the public tender procurement process as per the rules and requirements stated in the Regulation No. 9/2011 Coll. Accreditation against the requirements of ISO/IEC 17065 (product certification) is used for assessment of professional competence to ensure electronic tools are used competently and therefore, safely.

Ensuring the competence of Fire Risk Assessors

The responsibility to perform an assessment of fire risk, review such an assessment and to take fire safety measures, rests with duty holders. Both the Scottish Government and the Scottish Fire and Rescue Service recommend that duty holders who wish to contract the services of external fire safety risk assessors, verify that the assessor is competent in fire risk assessment. One way of verifying the competence of an individual assessor is to select the assessor from a list of competent fire risk assessors maintained by a professional body or an accredited third-party certification body.

The safe management of asbestos in commercial property

The UK's Health and Safety Executive (HSE) introduced regulations to protect workers and the wider community from the risks of exposure to asbestos. Amongst other requirements, the Control of Asbestos Regulations require testing for the presence of asbestos to be carried out by a laboratory that is accredited against the requirements of ISO/IEC 17025, the international standard for testing laboratories.

HSE also recommends that, where surveys are carried out for the presence of asbestos, they should be carried out by inspection bodies that are accredited against the requirement of ISO/IEC 17020, the international standard for bodies performing inspection. HSE strongly recommends the use of an accredited surveyor to safely manage asbestos. The regulator recognises that accreditation provides clients with an assurance of a surveyor's competence. A review of the effectiveness of the Regulations concluded that:

- The Regulation minimised the risks from exposure to asbestos, keeping workers and the community safe. The review stated that the fall in exposures to asbestos between 1980 and 2015 will lead to 25,700 fewer deaths from mesothelioma and lung cancer in the 100 years between 2001 and 2100.
- Costs to business and government/taxpayers, as well as costs to the individuals affected, both in terms of financial costs and the impact of quality of life and loss of life, when applied to those estimates to the yearly profile of prevented cancer deaths between 2001 and 2100, the present value of the benefits to society of preventing those cases of cancer is estimated at £20.9 bn.

For Businesses

Businesses can demonstrate compliance with best practice by implementing a health and safety management system in order to:

- Improve reputation and increase opportunities to gain new business
- Minimise risks of downtime through accidents
- Demonstrate commitment with legal obligations
- Achieve potential cost savings from public liability insurance premiums
- Attract and retain staff

In a number of areas, it is a requirement to use accredited services before placing products on the market; in others it is a de facto 'licence' to trade as key purchasers expect it. Accreditation provides market differentiation and objective proof that products are safe and meet specification.

Accreditation is increasingly recognised in tender documents and for overseas trade. In some cases, it can result in reduced levies or audits.

Examples of how businesses are gaining tangible benefits from using standards and accreditation can be found on the Business Benefits website at **http://business-benefits.org**

Case Studies:

Accreditation reduces the need for regulatory audits and the associated costs

Accreditation of laboratories under the Drinking Water Testing Standard Scheme (DWTS) significantly reduces the burden of Drinking Water Inspectorate (DWI) audits, as the need for the Regulator to routinely audit or inspect the laboratory is removed. Conversely, if a laboratory chooses not to adopt DWTS, they will be subject to risk-based vertical audits, including audits of samplers by the DWI. The costs of DWI audits or inspections of laboratories used by water companies are recovered by the DWI, and so there are clear financial benefits of being accredited under the scheme.

BuildSafe Northern Ireland requires OHSAS 18001 in construction tenders

Contractors, consultants (and their supply chains) seeking to tender for public sector works contracts must be able to satisfy the Government Construction Client that they have the resources and competence to manage health and safety. Businesses with OHSAS 18001 accredited certification are therefore well placed to be eligible to tender for work.

Removing rogue taxi operators

All taxis in Sweden must be linked to a reporting centre to transfer data from each vehicle's taximeter equipment (wireless and digitally) to provide details of distances travelled. The Swedish Transport Agency, responsible for the registry of the accounting centres, has introduced this policy to reduce tax fraud and to remove the number of rogue taxi operators. In order to provide confidence in the system, the reporting centres must ensure that their equipment is certified by an accredited certification body.

Better loan and insurance rates offered to Japanese businesses managing risk

The Development Bank of Japan (DBJ) offers more attractive loan rates and discounted insurance premiums to commercial businesses that have taken steps to increase their resilience in case of emergency. The bank screens metrics around business continuity, preparedness, and mitigation and recognises that accredited certification of a business continuity management system to ISO 22301/ 22313 helps to manage risk exposure.

ISO 45001 – Occupational health and safety

On 12th March, ISO published ISO 45001, Occupational health and safety management systems – *Requirements, that provides a framework for organisations to improve employee safety, reduce workplace risks and create better, safer working conditions.*

Accredited certification to this standard can help businesses improve its ability to respond to regulatory compliance issues, reduce disruption costs, and reduce the cost of insurance premiums.

What benefit does accreditation provide?

For Employees

Working for a company that has implemented an occupational health and safety management standard sends a clear signal to employees and stakeholders that they view employees' health and safety as a priority within the organisation. It will identify risks and ensure a safe working environment.

Case Study:

Reduced workplace accidents result in insurance premium reductions for businesses in Italy

Italy's Workers' Compensation Authority, INAIL, the national governmental institute for insurance against accidents at work, has seen that organisations who hold accredited certification to the Health and Safety management systems standard, OHSAS 18001, have reduced workplace accidents by up to 40% in some sectors. As a result, INAIL offers businesses up to 28% discounts on the cost of insurance premiums for businesses with OHSAS 18001 accredited certification.

Public confidence can be gained from goods or services that are accompanied by an accredited certificate of conformity. International accreditation agreements ensure that such goods and services placed on the market, from which ever country of origin, meet standards of quality and safety.

Case Studies:

Certification improves safety levels of New Zealand adventure tourism

All adventure tourism operators throughout New Zealand require safety certification under the New Zealand Adventure Activities Certification Scheme. Providers need to undergo and pass a safety audit that certifies safety processes meet the safety audit standards.

Supporting protection from terrorism

The Department of Homeland Security's BioWatch Program provides early detection of a bioterrorism event and helps communities prepare a coordinated response. The combination of detection, rapid notification, and response planning helps federal, state, and local decision-makers take steps to save lives and mitigate damage.

The BioWatch Quality Assurance (QA) Program ensures that the BioWatch Program continues to provide actionable results with high confidence to local public health decision makers. The QA Program was established in 2011 to ensure field and laboratory operations are conducted according to program policies, protocols, and QA and quality control (QC) requirements to ensure the defensibility of results. Laboratories must be accredited to participate.

Ensuring the effective use of CCTV through accredited certification

The UK Government has introduced a surveillance camera code of practice that contains 12 guiding principles to ensure and demonstrate to communities that cameras are only ever used proportionately, transparently and effectively by the relevant authorities (police, police crime commissioners, local authorities and non-regular police forces). Accredited Third party certification enables organisations to clearly demonstrate that they comply with the surveillance camera code of practice. Certification indicates best practice and compliance with the code.

Improving product safety

A Europe-wide study conducted by the International Federation of Inspection Agencies (IFIA) revealed that nearly 80% of products tested bearing the CE-mark through self-declaration of conformity (SDoC) did not comply with EU regulations. The survey also found that 16% of products showed safety-critical failures, resulting in a high risk of shock or fire. This compares to less than 1% for products with third-party accredited certification. The report recommends that for sensitive and high-risk products, a more robust approach that relies on independent third party, on either a mandatory or voluntary basis, should be taken to ensure that products placed on the market are safe, compliant and sustainable.

Further information

Accreditation provides a globally-recognised tool to not only assess and control risks of the internal operation of businesses, but also the products and services that they place on the market. In this way, Regulators, purchasers and employees can demonstrate confidence that accreditation delivers a safer world.

Visit **http://www.publicsectorassurance.org/topic-areas/health-safety/** to access research, case studies and supporting information relating to the positive benefits of accreditation in the delivery of health and safety policy.

Visit **www.businessbenefits.org** for further examples of how businesses can benefit from standards and accreditation.

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How Accredited Certification Bodies can support delivering a safer world in Bangladesh?

M. Liaquat Ali

Why accreditation is needed?

Accreditation is a requirement of World Trade Organization (WTO) agreements, where Bangladesh has signed since its inception back in 1995. Accreditation as tool of WTO supports free movement of goods and services across borders from one country to another country. Importing countries very often imposes restrictions, which are not following the provisions of WTO agreements. WTO says in its different agreements that countries are encouraged to adopt international standards for trading products and services. World Health Organization (WHO), International Labour Organization (ILO), International Maritime Organization (IMO), Food and Agriculture Organization (FAO) and many other UN organizations also encourage adopting international standards for health and safety issues of products and services. For sustainable development compliance to international standards is a major requirement by all interested parties including regulators and buyers. Regulators ascertain the interest of citizens.

Exception can only be made on the ground of scientific evidence, cultural differences and religious values. WTO also says standards and regulations are to be made non discriminatory and impartiality should be maintained.

Where we stand in Bangladesh?

Bangladesh government has established Bangladesh Accreditation Board (BAB) in 2006. After a reasonable capacity building period It has started awarding world class accreditation since 2012. BAB is a signatory to ILAC MRA (International Laboratory Accreditation Cooperation Mutual Recognition Arrangement) and APLAC (Asia Pacific Laboratory Cooperation) MRA for laboratory and inspection body's accreditation. We are grateful to the personnel working in BAB, its client organizations and supports from the government, especially from the ministry of industry. BAB and Conformity Assessment Bodies (CAB) – Certification Bodies (CB) still need to go a difficult path to become IAF MLA (International Accreditation Forum Multi-Lateral Arrangement) signatory. If it is delayed then foreign CBs will capture the Bangladesh market and deprive local capacity building, which is undesirable for our economy and prestige.

Status of CBs in the country

CBs are working to provide certification in ISO 9001 QMS (Quality Management System), ISO 14001 EMS (Environmental Management System), OHSAS 18001 (Occupational Health and Safety Management Systems), ISO 22000 FSMS (Food Safety Management System), ISO/IEC 27001 ISMS (Information Security Management System), ISO 20001 ITSMS (Information Technology Service Management System),ISO 22301 BCMS (Business Continuity Management System), ISO 30001 SRMS (Ship Recycling Management System), ISO 37001 ABMS (Anti bribery Management System), ISO/IEC 17065 Product Certification and many others as per need of interested parties. If the CB is not locally accredited, then it is difficult to ensure its performance, quality, redress complaints and impartiality. It is expected that BAB seriously works to get status of MLA signatory of IAF on various certification standards.

BAB and BACB

BAB in its governing board meeting can discuss this issue with the representative of the Bangladesh Association of Certification Bodies (BACB).

BACB was established in 2006, but its activities are not visible in the country. We know that similar organization in the United Kingdom (UK), British Association of Certification Bodies plays a significant role in standards, certification and accreditation in UK. Bangladesh Standards and Testing Institution (BSTI) is representing the BACB in BAB board. Needs and expectations of Certification Bodies operating in Bangladesh may be addressed by BSTI in BAB board. We want fair competition, fair trade and well being of the citizens of Bangladesh, which consist employers, employees, buyers and general citizens.

Let us demonstrate confidence in accreditation

This world is a global object, which needs safer world through globalization, free market economy, harmonization of standards and rules by all interested parties. A risk free quality, environment, health and safety world and space is the requirement of the day. Accreditation can definitely play significant role in Bangladesh and abroad. Let us demonstrate confidence in accreditation.

Director,
Asia Region of United Certification Services Ltd
and First Dir ector General of BAB.

QUALITY ASSURANCE (QA) IN ANALYTICAL MEASUREMENTS*

Amir H. Khan, PhD

1. Introduction

1.1 The ever increasing industrial production of new materials is putting increasing demands on analytical information on quality specifications of the materials. This information is utilized in making decisions as to the suitability of the materials for their intended uses in different sectors of national economy including human health and environment. Considering the complexities of new materials, the metrology laboratories are thus required to make measurements for both qualitative and quantitative information, with utmost care and using the best available resource and knowledge and to provide test results that can be considered as reliable and scientifically defensible, and so fit for the purpose.

1.2 As the chemical nature of the newer materials is so diverse and huge in numbers, and most of measurement data are to be provided timely, with affordable cost, analytical measurements are now made with complex and sophisticated instrumental processes. Since each analytical system for specific parameter functions within its design limitation, in selecting an analytical method based on the use of a particular instrumentation, limits of the method must be taken into consideration. In chemical metrology, the analytical chemists should have full understanding of the method and its limitations to obtain data with adequate quality to satisfy the end-users' requirements. The quality of the data is evaluated by the level of uncertainty assigned to it.

1.3 As quantitative measurements are estimates of true value of the measurand and have some level of uncertainty; measurements must be made in such a way that the uncertainty can be assigned within a stated probability, without which no data are useful. The objective of quality assurance in analytical measurements is to reduce errors to acceptable limits and to provide means of ensuring that the data so generated have high probability of being of acceptable quality. In this article, how quality assurance programs in materials testing laboratories are established is discussed.

2. Approach to Quality Assurance (QA)

2.1 Quality assurance is what is done to provide a correct solution to an analytical problem with sufficient accuracy and precision to support subsequent decisions. The goal of quality assurance program in analytical laboratory is, therefore, to provide such guidelines that when followed systematically in chemical measurements, will generate results with assigned uncertainty within defined confidence intervals (i.e., 95%) to fit for the purpose. The cost should be affordable and the service should be timely provided. The time and cost of analysis, however, depends on the quality specifications required by a particular data use objective, for example, Pb and Ca measurement in powder milk, one is for toxicity (Pb) and the other for nutrition (Ca) analysis and these analyses require different methods.

2.2 In overall consideration, it is the Quality System (QS) of the laboratory and the commitment of management that determines how the objectives of QA programs will be achieved to provide science based analytical information that is reliable and defensible, and thus fulfills the end-user requirements of data quality.

3. Basics of Quality Assurance

3.1 Consider a practical situation that a factory produces 1000 items in a day, 365,000, a year, with a certificate of quality specifications required for its specific use. The customer of the product is to be assured of its quality for the price he is paying. This needs analysis of the product for a specific measurand, batch by batch. The natural question is – how many of the products of the lot should be analyzed per year so that a defect free product is marketed, satisfying customers' requirements and minimizing the number of recall products. The decision as to the number of products to be analyzed per year is based on the 'Quality Policy' of the factory.

3.2 Such a Quality Policy will bring economic benefits to the manufacturer. So, the number of tests to be performed for quality control of the product is to be defined statistically by representative sampling of each batch so that recall is small, say 100, 365 or what number to obtain results with acceptable limit of accuracy and precision.

3.3 In analytical laboratory, the product is the raw data, treated data and the results of measurements. The raw data are the individual values of a measured quantity, e.g., measured volume from a burette or the area of a chromatographic peak.

3.4 The treated data are the concentration or amount found by applying a calibration procedure to obtain the raw data. The results are the end product of the analytical process that is reported with mean, standard deviation and confidence interval by applying statistics.

If the results are reported by satisfying the acceptance criteria set by a specific demand (limits), the QA process is considered to be established in the laboratory.

4. Data Use Objectives

4.1 The important goal of quality assurance (QA) is to make sure that it meets the customer requirements in terms of quality specification, e.g., $\pm$ 5%. Quality is a subjective term. It could be high in one case but low or unacceptable in another.

If a weighing balance is used to weigh kilograms of mass, it does not need to measure a mass nearest to milligrams, but when a drug tablet contains an active ingredient of 2 mg, you cannot report its mass as 2 ± 1 mg, rather it should be 2.1 ± 0.1 mg, simply because, in the case of drugs, the therapeutic dose is just less than the lethal dose. So, one has to be more careful to manufacture drugs than, if he wants, 'to make spaghetti sauce'.

4.2 The critical step in quality assurance is to write clearly and concisely the use objectives of the data and results. This can be possible only when the analyst has developed a clear understanding of what purpose the results will serve (explained in the following sub-section with an example).

4.3 Defining Data Use Objectives

(1) In drinking water supply, the process of chlorination is used to reduce fecal coli forms or total coli forms to the standard specification. Depending on the load, chlorination dose is defined. This is to be recognized that during traditional chlorination process, chlorine reacts with organic compounds in water and produces disinfection by-products like trichloromethane, trichloroacetic acid, chlorine dioxide (ClO2), etc which might be harmful to humans. If now a new chlorination process is to be introduced into the drinking water supply system, the data use objectives are to be stated as:

- the analytical results shall be used to determine whether the new chlorination process results in at least 10 % reduction of formation of 'disinfection by-products' (DBP).

- to make the new chlorination treatment process scientifically viable and economically sustainable, the errors in 10% reduction is to be small and clearly distinguishable from experimental errors to make the desired reduction in DBP formation real.

(2) If this error target is achieved, QA/QC principles are firmly established in the laboratory. How to achieve this goal is explained in the QA and QC methodologies.

5. Quality Assurance Methodologies

The analytical process of chemical measurements to provide solution to the problem involves several steps, illustrated in Figure 1. Each of the steps starting from defining of the analytical problem, planning for analysis, to reporting the results with assigned uncertainty has the elements of quality assurance (QA) and good laboratory practice (GLP). Two concepts are involved in QA methodology - Quality Control and Quality Assessment,

- Quality Control is the system of activities established to control errors,
- Quality assessment is the process to verify that the system is operating within acceptable limits,
- Good laboratory practices (GLP) describe general operations of the laboratory that must be followed and maintained in all analyses including data recording, maintaining records, use of high quality reagents, cleaning of glassware, etc.

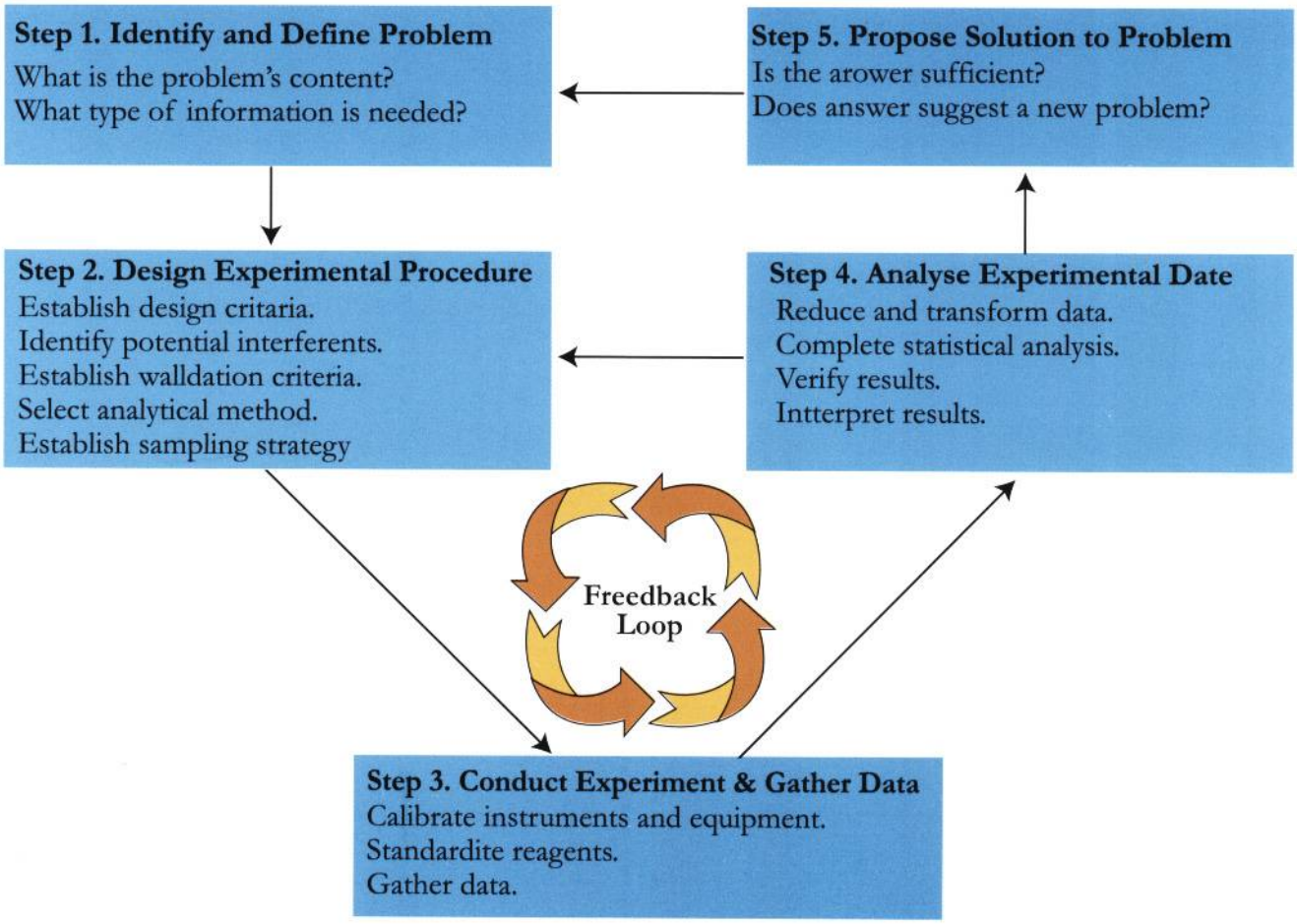


Figure 1: Flow diagram of analytical approach to solving problems.
(Source: J. Chem. Educ. 1982, 59, 201–202.

5.1 Analytical Specifications

(1) Once the data use objectives are known, analytical specifications can be set, starting from sampling to reporting of the results. In this process, sample is the most critical part. The first consideration is that the sample must be representative and contamination free. The next is the sample size, sample container, what method should be selected, and what precaution should be taken to preserve the integrity of the sample, etc, including storage conditions.

(2) The concentration level of the analytical parameter will determine how good should be the reagent quality and method blank which, in other words, will define the detection limit of the method.

(3) As quality assurance begins with sampling, the collected samples must be representative of the field situation. During collection, transport and storage of samples, the analytes must be preserved and no contamination is allowed. In this respect the axiom is: 'Bad samples only yield worst results, no matter how best is the analytical method'. The method can detect only what is present in the sample, not what is lost from the sample. That also requires that field blanks should be determined at times of sampling.

(4) In analyzing samples with low concentration, the analyst must understand what false negative and false positive finding is.

(a) False positive is that detects something above the legal limit, but actually it is below the legal limit.(horizontal line)
(b) False negative says that the analye is below the legal limit though the analyte exceeds the legal limit.

This situation in measurements may occur when concentration is low (micrograms/L or less). To avoid misclassification, measurement error must be kept at minimum. Figure 2 clarifies the situation.

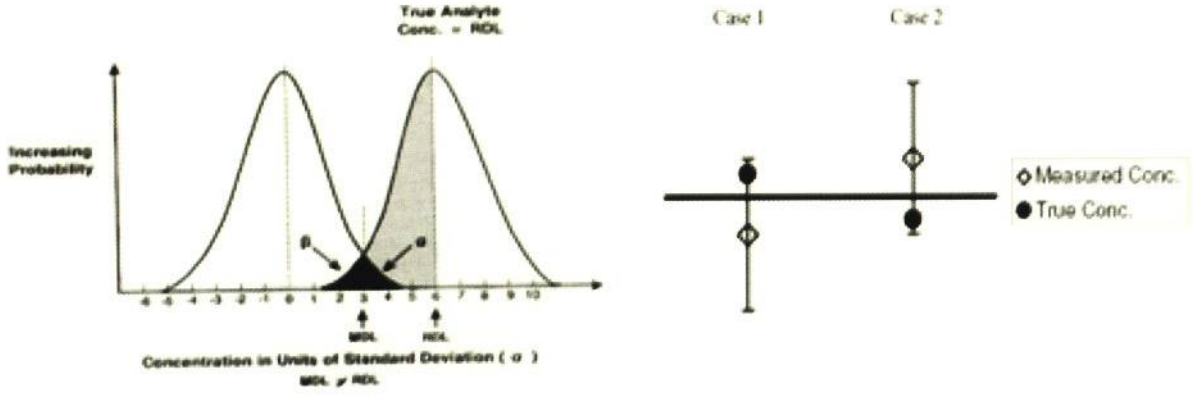
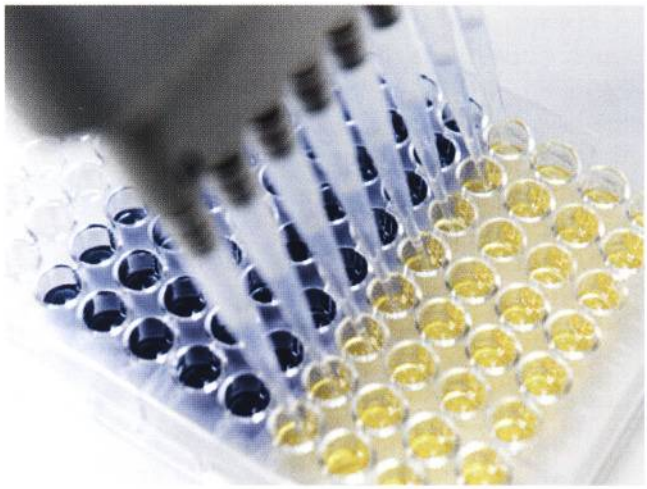


Figure 2: (a) Distribution of measurements of a blank and a sample, α indicates false positive and β indicates false negative in sample analysis. The reliable detection level (RDL) is found at 6σ concentration unit where the probability of finding the analyte is maximum; (b) Possible mistakes made in measurements with large uncertainty when comparing measurements against a given threshold value (horizontal line in b is the legal limit of the parameter) near the detection limit (crossover point of two distributions at 3σ, MDL • RDL).

(5) In analysis sometimes false conclusions are drawn even though the analysis is performed in best possible way as depicted in Figure 2. In such situation, for example, in drinking water supplies, it is better to certify with false positive than to certify with false negative.

(6) It would be worse to certify contaminated water with false negative finding than to certify that safe water is contaminated with false positive finding. So, in QA the rate of false positive and false negative should also be defined. In the case of DW, it is important to have low rate of false positive than low rate of false negative. But in the case of drug testing in athletes, false positives must be minimized to protect the innocent athletes.



5.2 Method Specifications

The selected method must have adequate specifications for intended use. These method specifications include:

- Selectivity
- Sensitivity
- Accuracy
- Precision, and
- Detection limit

All of these features must meet the measurement requirements. Before applying the method, it should be validated to establish the features using standard documented procedures known as SOP (standard operating procedure).

5.2.1 Method detection limit (MDL)

(1) MDL is the lowest possible concentration of a substance that can be identified, measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined in a given matrix containing the analyte. That is, only ~ 1% of the sample containing no analyte will give signal greater than the detection limit. In Figure 2a, detection limit of measurement distribution of a blank and a sample is indicated (α- false positive and β- false negative).The dark shaded intersection at 3σ (units expressed in standard deviation) is the detection limit (MDL).

(2) To measure the actual detection limit, first make an estimate from replicate signal observations from a blank used in the analysis. Then, make a sample with concentration 3- 5 times higher than the estimated MDL and find the standard deviation, s, of replicate measurements (n= 5-7). Using the slope of the calibration curve used in the analytical procedure, calculate the limit of detection of the method (LOD) using the equation:

$$LOD = 3s/m \quad \text{.....(1)}$$

where s is the standard deviation of blank measurements (10 times of method blank) and m is the slope of the calibration curve (within the linear range, constructed with 5 standards (triplicate measurements of each concentration). The signal detection limit is defined as: ydl = yblank + 3s. The calibration line: ysample – yblank = m x (sample concentration).

(3) The quantification limit (LOQ) should be at least 10 times greater than the limit of detection (LOD) of measured concentration defined as: LOD = 10s/m

5.3 Analytical Procedure Specification

An appropriate method is selected and validated for its intended use and before use it must be validated. The method validation is a process of proving that the selected analytical method is acceptable for the purpose. In the validation procedure (SOP for method validation), certain analytical features of the method such as the following are verified.

- Accuracy- closeness to the true value which is an estimate,
- Precision- how well replicate measurements agree with each other, expressed as standard deviation,
- High purity reagents including reagent water for preparations (to have low blank values),
- Selectivity- tolerance of the instrument to interference (system stability to interference)
- Use of certified reference materials (CRM) (traceable to NIST or equivalent) to establish accuracy,
- Method detection limit (MDL)- depends on the level of blanks; high blank values will reduce the detection capacity of the method (Method detection limit (MDL) = S/N $\geq$ 3). So, blanks must be at acceptable level, controlled by periodic checks, particularly, for low concentration measurements.

5.4 Calibration

(1) Two types of calibration are mostly required in chemical measurements - physical response characteristics of the analytical instrumentation and ancillary measurements such as temperature, humidity, volume and mass. Some of the ancillary calibration services such as the calibration of electronic balance, thermometers, hygrometers, etc are to be annually procured from the national institutions like BSTI and these are to be traceable to international standards agency, NIST (National Institute of Science & Technology, USA) or equivalent. For others, in-house capacity is to be utilized..

(2) For quantitative measurements, all analytical systems must be regularly calibrated using certified reference materials that are traceable to recognized standard institution such as NIST. Best, if the CRM matrix closely matches the sample matrix. If not available, standard addition method is to be used for matrix effect correction. For successive addition of standards (S) to sample solution, Equation 2 is used.

$$I_{s+x} \cdot \frac{V}{V_0} = I_x + \frac{I_x}{X_i} \cdot S_i \cdot \frac{V_s}{V_0} \quad \text{.....(2)}$$

y-function x-function

where
I = signal intensity, X = sample concentration, S = standard added, V = total volume, Vo = initial volume, Vs = standard volume added, i = index of successive addition. Figure 4 demonstrates the matrix effect in Pb analysis in different urine samples. To correct this effect, standard addition method (Figure 3) is used where the successively added concentrations are x, 2x, 3x, etc and x is the concentration of sample without addition; extrapolation to the negative gives the analyte concentration.

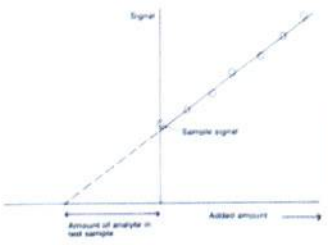


Figure 3: Standard addition method of concentration calibration. GF-AAS

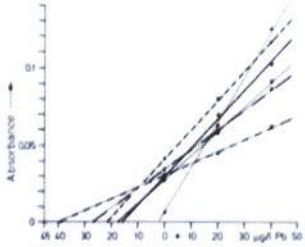


Figure 4: Matrix effect in Pb analysis by. in different urine samples

5.5 Types of Blanks

Blanks account for interference of other species in the analytical sample. For trace analysis, the sources are the reagents used in the process. Frequent analysis of blanks is so necessary to identify and control sources that raise the blank values.

- Method blank: Method blank is the sample that contains all components of the sample except the analyte.
- Reagent blank: Reagent blank is the part of sample blank which comes from the purity levels of reagents used in the analytical procedure.
- Field blank: Blank value is added to laboratory sample when it is exposed to sampling site during sample collection and transported to the laboratory and reanalyzed.

5.6 Spike Recovery Analysis (for Matrix Effect Correction)

(1) In field sample analysis, it is often encountered that the sample matrix is not exactly matching with CRM matrix used for calibration of the instrument. This variation in matrix composition sometimes may increase or decrease the analyte signal.

(2) To correct for this variation, spike recovery analysis is performed, where an analyzed sample is spiked with a known amount of standard used for calibration. Ideally, if the increase in the spiked signal is proportional to the added amount, then there is no matrix effect, otherwise, there is and to correct the effect, the recovery of the spike added is to be studied in reporting the results.

(3) The acceptable limit of spike recovery for environmental samples could be 90 – 110 %, depending on whether the signal decreases or increases after the addition of the spike. This is termed in another way as the standard addition method of calibration (explained above) where at least two increasing additions are made over the sample concentration.

(4) Spike recovery is calculated as:

$$\% \text{ Recovery} = [Csp - Cusp]/ Cadd \times 100 \quad \text{.....(3)}$$

where the concentration subscripts are: sp = spike, usp = unspiked and add = spike concentration added.

5.7 Use of QC Sample

(1) QC samples are made with known concentration of the analyte prepared from CRM or SRM of appropriate concentration within the linear range of the calibration curve.

(2) In a series of analyses, QC sample is used, say, after each 10 samples, to check the instrument stability and the status of the calibration or response of the instrument to measure the analyte as it was during calibration. If a significant loss of signal occurs, then the system is to be recalibrated.

(3) The acceptable limit of response variation should not be less than 95% of the concentration used in the calibration. QC sample is prepared from a CRM traceable to NIST. It is used as an unknown sample by the analyst to eliminate any bias if introduced by the analyst. It is one of the quality control measures.

5.8 Use of Control Chart

(1) Another important tool used in quality control in chemical analysis is a visual representation of the confidence intervals of the Gaussian distribution of errors in measurements. The features of the chart known as Shewhart chart clearly caution or warn the analyst when he needs to check whether his measurement procedure/system is under statistical control, because the results are deviating from the upper and lower acceptance limit.

Figure 5 below explains a situation when the analyst needs to review his system's performance variation with time, when the same standard routinely analyzed. The details of the use of Control chart in data quality control are given in Reference 2.

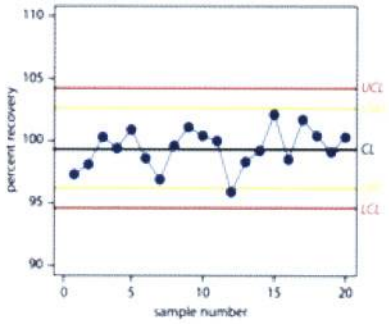


Figure 5: Shewhart quality control chart

(2) In Figure 5 the red line is the warning limit and the yellow line is the action limit. For a Gaussian distribution of measurements, 95.5% of the data will be within $\pm 2\sigma\sqrt{n}$, or, 99.7% within $\pm 3\sigma\sqrt{n}$, where n is the number of measurements. If n = 25, ~ 4.5% of measurements will be outside the warning limit and ~0.3% outside the action line. It is unlikely that two consecutive measurements would be at the warning limit (probability = 0.045 x 0.045 = 0.002), if the measuring system is under statistical control.

When a result exceeds a control limit, the most likely explanation is a systematic error in the analysis or a loss of precision. In either case, it can be assumed that the analysis is no longer is in a state of statistical control.

(3) The following are the general rules to prove that the measurements are done under statistical control.

Rule 1. An analysis is no longer under statistical control if any single point exceeds either the UCL or the LCL. By setting the upper and lower warning limits to CL $\pm$ 2S; we expect that no more than 5% of the results will exceed one of these limits.

Rule 2. An analysis is no longer under statistical control if two out of three consecutive points are between the UWL and the UCL or between the LWL and the LCL.

If an analysis is under statistical control, then we expect a random dis¬tribution of results about the center line. The presence of an unlikely pat¬tern in the data is another indication that the analysis is no longer under statistical control.

Rule 3. An analysis is no longer under statistical control if seven consecu¬tive results fall completely above or completely below the center line.

Rule 4. An analysis is no longer under statistical control if six consecutive results increase or decrease in value.

Rule 5. An analysis is no longer under statistical control if 14 consecutive alternate up and down in value exist.

Rule 6. An analysis is no longer under statistical control if there is any obvious non-random pattern to the results.

5.8.1 Control Chart for other uses

(1) Control charts can be used to monitor performance on blanks, calibration checks, and spiked samples, to see if the results are stable over time or compare the performance of different employees.

(2) Control charts can also be used to monitor sensitivity and selectivity, particularly, if the lab encounters different sample matrices.

5.9 Quality Assessment

(1) The quality assessment is the process of (i) collecting data to show that the analytical procedures are operating within specified conditions and (ii) verifying that the final results meet the end - use objectives.

(2) Documentation is critical to quality assessment. All documentation related to QA including how to record information in the notebooks should be prepared according to ISO/IEC 17025 guidelines and periodically updated and checked for compliance by internal audits.

(3) National Government Agencies set requirements for quality assurance in materials testing and environmental analysis (ASTM, US EPA in USA) (DOE, BSTI in Bangladesh).

6. QA and QC Summary

6 .1 QAQC requires careful planning and an attention to details. Creating and maintaining a quality assurance program is one way to help ensure the quality of analytical results. Quality assurance programs usually include elements of quality control and quality assessment.

6.2 Quality control encompasses all activities used to bring a system into statistical control. The most important facet of quality control is written documentation, including statements of good laboratory practices, good measurement practices, standard operating procedures, and protocols for a specific purpose.

6.3 Quality assessment includes the statistical tools used to determine whether an analysis is in a state of statistical control, and, if possible, to suggest why an analysis has drifted out of statistical control.

6.4 The tools of quality assessment are the analysis of (i) duplicate samples, (ii) blanks, (iii) standards (QC) and (iv) the analysis of spike recoveries.

6.5 Control charts provide continuously an ongoing evaluation of an analysis. A Control Chart plots a property, such as a spike recovery, as a function of time. Results exceeding warning and control limits, or unusual patterns of data indicate that an analysis is no longer under statistical control.

Table 1: Quality Assurance process summary

QA Specification	Question	Action
Use objectives	Why do you want the data and results nd how will you use the data?	Write clearly data use objectives
Results Specification	How good do the numbers have to be?	Write specifications ▪ Select methods to meet specifications ▪ Consider sampling, precision, accuracy, linearity, selectivity, sensitivity, detection limit, robustness, rate of false results ▪ Employ blank, fortification, calibration checks, quality control samples, and control chart to monitor performance. ▪ Write and follow standard procedures.
Performance Assessment	Were specifications achieved?	▪ Compare data and results with use objectives. ▪ Document all procedures and keep records suitable to meet use objectives ▪ Verify that use objectives were met.

7. Precision and Accuracy Control

- Precision and accuracy of a method are best evaluated by using Shewhart control charts discussed above by applying the principles of data acceptance criteria

- Precision and accuracy checking should allow slow deterioration of data quality to be identified and corrected before data have to be rejected.

7.1 Precision check by duplicate analysis

(1) Use of duplicate analysis as a method of precision checking has two distinct advantages:

- quality control materials are matrix-matched, and
- the materials are readily available at no extra cost.

(2) Since the samples are analyzed using the same method, equipment and reagents, the same bias should affect all results. Consequently, duplicate analyses are only useful for checking precision; they provide no indication of the accuracy of the analyses. Results from duplicate analyses can be used to calculate a relative range value, R, by using the equation:

$$R = \frac{(X1 - X2)}{(X1+X2)/2}$$

where X1 and X2 are the duplicate results from an individual sample and X1-X2 is the absolute difference between X1 and X2. These values are then compared with the mean relative range values previously calculated for the assay during validation. The simplest method of assessment is to use the upper concentration limit (UCL), where UCL = 3.27 × mean R value.

(3) When any value is greater than the UCL, the analytical procedure is out–of- control. This method, although statistically valid, provides no indication of deteriorating precision. A better and more practical approach is to use acceptance criteria based on warning and action limits.

7.2 Accuracy

Accuracy can be safeguarded by regular participation in external quality control exercises and by the regular use of certified reference materials.

7.3 Accuracy control using CRMs

- Certified reference materials (CRMs) are matrix-matched materials with assigned target values and assigned ranges for each variable, reliably determined from data obtained by repeated analysis.
- QC samples of appropriate concentration within the linear range of the calibration curve are prepared from CRM or SRM calibration curve.
- In a series of analyses, it is used as an unknown sample, say, after each 10 samples, to check the instrument stability and the status of the calibration or response of the instrument to measure the analyte as it was during calibration. If a significant loss of signal occurs, then the system is to be recalibrated.

7.3.1 Data Acceptance limit in accuracy check

(1) In a series of measurements calculate, the percent recovery, P, of the standard solution as :
P = (100.X_(obs))/X_true
where X obs is the measured value of the standard, using the calibration curve and Xtrue is the certified value of the reference standard.

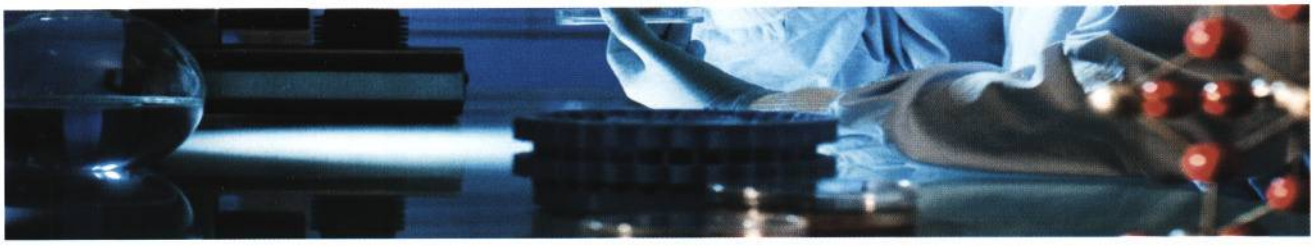
(2) After 10-20 standard solutions of the same concentration are analyzed over the time, calculate the average of percent recovery, Pavg and its standard deviation Sp. The acceptance limit at 95% confidence limit is: Pavg $\pm$ Sp.

(3) In a subsequent measurement, if the percent recovery of the standard is not within Pavg $\pm$ 3Sp, the measurement is out - of - control (OOC) and the system is to be recalibrated.

(4) QC sample is prepared from a CRM traceable to NIST. It is used as an unknown sample by the analyst to eliminate any bias if introduced by the analyst.

8. Uncertainty in Measurements

8.1 Uncertainty in analytical measurement is the measure of the error(s) associated with individual sources present in measurement. The result of the measurement is to be expressed with a high or low level of confidence but never with complete certainty. The variation in error assignment could be 0 - 100%, arising from different sources. The errors in experimental measurements are classified into two groups, systematic errors and random errors.



8.2 Systematic error

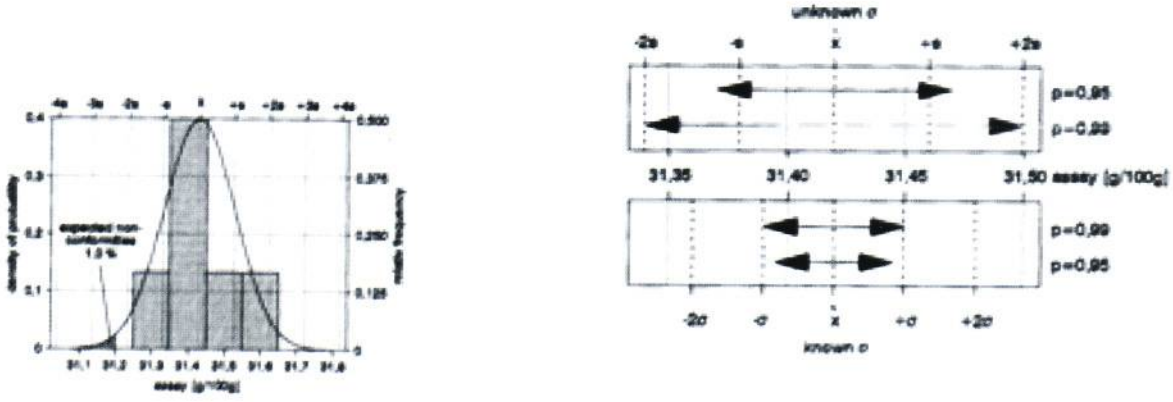
Systematic errors, also known as determinate error, arise from the flaw/defect in the equipment used or in the design of the experiment. In this case, if the experiment is repeated under identical conditions, the error would be reproducible. Systematic errors can be found out and corrected. For example, if a pH meter is incorrectly calibrated with a buffer, it will produce systematic error. If a buffer is used with known pH of 7.00 units to calibrate it, it will give result like 7.08, 0.08 unit lower. With this pH meter if you measure a pH of 5.60, the actual pH would be 5.68 units. The use of CRM buffer with certified pH value can correct this error.

8.3 Random error

Random error, also known as indeterminate error, arises from a number of uncontrolled variables, such as reagent quality, unstable blanks, errors in calibration, etc. Random errors cannot be corrected. In repeated measurements, random errors have equal chance of being positive and negative. Instrument electronic noise is also a source of random error. If you make n number of measurements, where n is is equal or greater than 30, for example, each data will be different and errors in the measurement will follow a normal distribution of errors like:

$$y = [\exp [-(x - \mu)^2 / 2\sigma^2]] / \sigma\sqrt{2\pi} \quad \text{.....(4)}$$

where μ is mean, xi is the individual results, is the standard deviation, is the number of measurements An example of distribution of random errors is illustrated in Figure 6.



a b

Figure 6: (a) Distribution of errors around most probable value of measurements with defined confidence intervals for the known and unknown (b). (Source Ref 9)

In Figure 2, results of 12 samples of hydrogen peroxide from a batch have been analyzed and presented in histogram of frequency of occurrence. The full width at half maximum (FWHM) of the distribution curve (0.4 probability density) indicates the dispersion of errors. If the limit of the acceptable value is 31.2g/100g, non- conformity of about 1% is observed at 95% confidence limit, because of small number of measurements. If this result is not within the tolerance specification of the manufacturer, repetitive measurements within the batch will be required to improve the distribution to be Gaussian and then comparing the results with known standard, random errors could be controlled and the outliers can be minimum at the same confidence limit (Fig. 6b).

9. Sources of Errors

The major sources of random errors are the analytical steps involved in any analytical measurement are

- sample preparation (by dissolving a definite mass of a sample in a definite volume),
- preparation of calibration standards solutions using CRM,
- calibration of measuring equipment and
- preparation of sample blank.

Each of these steps has some degrees of uncertainties, depending on the level of 'GLP' that has been established in the laboratory. But most significant of these sources is calibrants used to define the analytical function of the system response function of the instrument to input concentration. The measurement essentially consists of comparison of a known with unknown. The other two sources of errors are volumetric measurement and weighing of mass by a balance. Contributions from each of these sources are calculated to find the total uncertainty in the final results reported as $X \pm \Delta x$ unit with a defined level of confidence limit.

The detailed procedures of quantifying uncertainties in analytical measurements with examples Lead (Pb) analysis in soil by GF-AAS method is given in Ref.5.

10. External Quality Control

10.1 The effectiveness of correction or elimination of systematic errors is best evaluated by external data quality assessment process known as proficiency testing or interlaboratory comparison study where several laboratories participate to analyze the same property (parameter) and compare the results with each other against an assigned value by a reference laboratory.

10.2 In the comparison the difference between known and measured values of the test samples is to be reconciled with laboratory's own estimate of limits of random and systematic errors. While the random errors are well established by quality control process, any significant discrepancy can be attributed to the unexpected or incorrectly estimated systematic errors. The laboratory's performance is evaluated using the Z-score principle:

$$z_i = \frac{x_i - x_{assigned}}{\sigma_p} \quad \text{.....(5)}$$

where σ_p is the standard deviation of the interlaboratory mean, xi is the laboratory result. The ranges of the laboratory results are evaluated as:

If $|z| \leq 2$ "Satisfactory"

If $2 < |z| \leq 3$ "Questionable"

If $|z| > 3$ "Unsatisfactory"

The recovery results are deemed as acceptable if it complies with the defined criteria of 90-110 % for a spiked level in the range of 1-10 ng/g. The accepted Z–score value has to be equal or less than 2.

10.3 From the interlaboratory comparison process of laboratory performance evaluation, it is amply clear that materials testing laboratories operating in Bangladesh must pass this evaluation process that attempts to correct systematic errors in measurements. These are prerequisites of laboratories engaged in providing analytical testing services to get ISO 17025 Accreditation Certificate, an essential document for marketing their products (test results) in international trade and commerce. Accreditation, in fact, is another form of Quality Assurance.

11. Standard Operating Procedures (SOPs)

11.1 The Standard Operating Procedures (SOPs) are the fundamental documents in any QA process. It states what steps will be taken and how they will be carried out. Adhering to these procedural instruments (SOPs and GLP) would guard against normal desire to make shortcuts based on assumptions which could be false.

11.3 The rationale behind having SOPs is that in a laboratory, the same equipment is used by many to perform different analyses, each having different SOP.

11.4 Implementing the directions given in the SOPs is a part of the management plan of the laboratory. If the management plan is implemented, the most rigorous needs of QA are met.

11.5 Once a method is adopted, it must be used in a reliable and consistent manner to provide reproducible data. This can be best achieved by following the details of the written procedures (SOP). The general contents of a SOP for chemical analysis include the following:

1. Purpose
2. Scope
3. Definition of the terms
4. Safety precaution
5. Reagents & CRM
6. Apparatus/Equipment
7. Analytical Procedure
8. Data Analysis & Calculation.
9. Quality Control
10. Method limits and interferences
10. References

11.6 In reporting test results, two information must be provided, method detection limits (MDL) and uncertainty of the results, as per ISO/IEC 17025, 2005, without which no result would be fit for the purpose. The Laboratory Analyst with sufficient educational background and training experience must be certified to perform specific analytical jobs.

To conclude, all measurements to generate reliable and scientifically defensible analytical information must be performed when the analytical system is under statistical control. In doing so, follow the quotation faithfully:

"Until a measurement operation.....has attained a state of statistical control, it cannot be regarded in any logical sense as measuring anything at all".

C. E. Eisenhart

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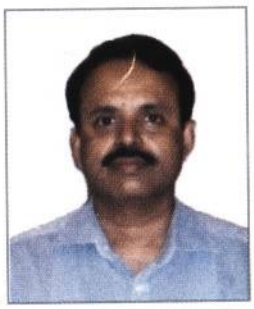
Risk-based thinking and ISO 9001: 2015



Md. Mahbubur Rahman

The International Organization for Standardization (ISO) published ISO 9001:2015 in September 2015. ISO has used a new common format known as Annex SL or the High Level Structure (HLS) to develop a standardized core text and structure for all management system standards. In this process ISO developed the 10-clause to ensure that management system standards are aligned with a set of common requirements and ensure greater harmonization among its many different management system standards. This facilitates the integration of management system standards by users.

There are additional key changes in the revised ISO 9001:2015 standard. They include enhanced leadership engagement in the management system, increased emphasis on organizational context, greater focus on risk-based thinking, more flexibility regarding documentation and fewer prescriptive requirements. This revised standard obviously creates some challenges for auditing the system. Traditionally audit of the system is generally conducted by the evaluation of components as metrics/key performance indicators for quality objectives. In this circumstance, auditing the system demands a demonstrated ability for planning documentation and the application of appropriate risk measures at the management level as part of process and system of the organization.

Risk is inherent in all aspects of a quality management system. The concept of "risk" in the context of ISO 9001 relates to the uncertainty of achieving the objectives of the system. Risk-based thinking is not new at all. It is an ongoing process and organization is required to address this to mitigate or eliminate the potential and identified risks for the effectiveness of the system. In previous editions of ISO 9001, a clause on preventive action was separated from the whole. But in the introduction of ISO 9001:2015 the concept of risk-based thinking is explained as an integral part of the process approach and preventive action part is replaced with "actions to address risks and opportunities." Practically Preventive action is built-in when a management system is risk-based.

In a study it was found that Risk appears in the normative parts of revised ISO 9001 eight times, and risk-based thinking appears once. Risk and risk-based thinking appear many times more in informative portions of the standard, e.g., the introductory sections and the appendix.

Risk and risk-based thinking addressed by the revised standard are summarized bellow for easy understanding.

- In Clause 5 top management is required to demonstrate leadership and commit to ensuring that risks and opportunities that can affect the conformity of a product or service are determined and addressed.
- In Clause 6 the organization is required to take action to identify risks and opportunities, and plan how to address the identified risks and opportunities.
- In Clause 8 looks at operational planning and control. The organization is required to plan, implement and control its processes to address the actions identified in Clause 6.
- In Clause 9 the organization is required to monitor, measure, analyze and evaluate the risks and opportunities.
- In Clause 10 the organization is required to improve by responding to changes in risk.

In the revised standard Risk is no longer implicit or limited to specific elements of the quality management process. It is now addressed throughout the standard and built-in to ensuring risk is considered from beginning to end of the whole management system. Organizations using this standard are now expected to identify risks and opportunities, and execute proactively by adding some systematic evaluation of potential and actual issues with the aim of making processes more robust and capable.
This will ultimately result in turning of risk-based thinking of the entire management system into a preventive planning tool.

Then the question is as to how an organization can address risk- based thinking in the quality management system. The way organizations manage risk varies depending on their business context (e.g. the criticality of the products and services being provided, complexity of the processes, and the potential consequences of failure). This may be done in differential sequential steps. First step- the organization needs to start a risk-driven approach in their organizational processes. Second step- identifying the risks and opportunities on the context of the organization. Third step- analyzing and prioritization risks and opportunities. Fourth step- action plan to address the risks. Fifth step- implementing the plan and necessary actions in the elimination or mitigation of risk. Sixth step- checking the effectiveness of the actions though appropriate methodologies (e.g. audit approach).

Certification is the task of compliance that delivers assurance of meeting specific requirements by product, service or system. For some industries, certification is a legal or contractual requirement. Auditing quality management system in line with the revised standard is also a challenge for Certification Bodies (CB). Auditors aspiring to conduct quality management audit using revised standard must have demonstrated ability to use knowledge and skill. CBs are encouraged to train their auditors and verify the results to ensure the relevant level of competence is demonstrated.

Bangladesh Association of Certification Bodies (BCBA) can organize training programs for the auditors and personnel involve in the implementation of quality management system on the revised standard with emphasis on Risk based thinking. On the other hand Bangladesh Accreditation Board (BAB) can work jointly with BACB and other stakeholders on the transition process and formulating appropriate guidance to facilitate certification programs. This joint approach will play a vital role in the development of a trustworthy and widely accepted quality infrastructure of the country.

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Factors Which Have Effect On Color Fastness To Light

Debashis Saha

During the usage of textile in our day to day life color fastness to light has a vital role in maintaining the aesthetic value of textile. Failure in color fastness to light is one of the common problems in textile industries. Especially for light shade, it is very difficult to achieve the requirements of client. If we have some idea which are the factors that have impact on color fastness to light then we may take some precaution before go through the dying process so that we may secure our product.

Let's first we know what is color fastness to light?

Color fastness to light is the property of a colored material, usually an assigned number, depicting a ranked change in its color characteristics as a result of exposure of the material to sunlight or an artificial light source.

A specimen of the textile to be tested is exposed to artificial light under controlled conditions, together with a set of reference materials. The color fastness is assessed by comparing the change in color of the test specimen with that of the reference materials used.

During color fastness to washing, water, dry heat or other wet fastness of the dyeing of print materials in respect of staining of adjacent materials usually dyes or pigment molecules detached from the fibre and become fade. But in case of light fastness; light (UV) falls on dyes & pigments and the UV photons with high energy excites the electrons of dye from ground state to exited state. The dye at the exited state is highly reactive and unstable so it comes back to the original ground state. During the quenching of dyes from exited state to ground state, atmospheric triplet oxygen reacts with dyes to form singlet oxygen. Under the presence of visible light the exited dye molecules react with the atmospheric oxygen to form super oxide radical. The singlet oxygen & super oxide radical formed is highly reactive and capable of destroying the dyes. The exited dye or pigment molecules undergo following processes which leads to fading.

- Photo oxidation
- Photo reduction
- Photolysis
- Photo tendering
- Photo sensitization

Now let's have a look what are the factors that have effect on color fastness to light

Dyestuff selection: The Chemical Structure of the dyestuffs is very important as the resistance of the dyestuffs or pigments to the photochemical attack is directly related to its chemical suture. The relatively high fastness to light of dyeing of anthraquinone dyes on wool and the poor light fastness to triphenylmethane acid dyes on the same substrate are directly attributed to the stability of one and insatiability of the other photochemical attack. Metal complex dyes show better resistance to fading than acid dyes as the metal can absorb UV energy and transforms into heat energy. Brighter shades of dye show poor resistance to color fastness to light as the electron movement of brighter shade dyes is higher and that's why the electrons can easily move to the exited state causing damage in the chromophore of the dyes of pigments which ultimate results is fading.

Amount of colorant present on the fibre: The colorfastness of a deep dyeing on print of a particular dye often differs noticeably from that of pale dyeing on print of the same the same dye on the same fibre when the principle effect of exposure to particular condition is to produce a change in the color of the material e.g. as in the case with exposure to light it is generally found that the deeper the dyeing on print (i.e. the greater the amount of dye present on the fibre, the higher is the fastness in respect of change in color exposure.)

Light fastness result of a reactive red color in different shade percentage

Shade%	Blue Wool rating
Reactive Red - 0.5%	3
Reactive Red - 1.0%	3-4
Reactive Red - 2.0%	4
Reactive Red - 3.0%	4-5
Reactive Red - 4.0%	5

ABs (BAB, NABCB, SLAB, PLVAC etc)

CABs (BV, SGS, BSTI, UNICERT etc)

recycling facilities

- ISO 50001:2011-Energy management systems—Requirements with guidance for use

In certain cases the fastness to light of deep dyeing may be two or more points (on the 1 – 8 Blue wool scale) than that of pale dyeing of the same dye. This is explained in part by the fact that the deeper the dyeing greater the amount of the dye which must be destroyed before variable change in the colour of the material becomes apparent.

The poor light fastness of many dyes on cellulosic fibres may result from resin finishing taken into account when selecting dyes for use in these circumstances. Cationic compounds applied to dyeing of direct dyes on cellulosic fibres to improve wet fastness can also extent on average influence on light fastness.

SUSTAINABLE SOLUTIONS OF FOOD SAFETY CHALLENGES IN THE SUPPLIED CHAIN

Sharmin Zaman Emon, Ph.D

Food safety is a multi-disciplinary, multi dimensional and multi sectoral issue. Ensuring food safety and healthy food is an important precondition of food security and is essential for good health in all countries, both in developed and developing. In contrast, food safety negatively affects people's life and imposes high economic and social costs. In addition, current modes of food production are seen as a major driver of environmental problems such as deforestation, desertification, eutrophication and fisheries collapse.

All of these are backdrop of a booming world population, rapid urbanization, diminishing natural resources and critically stressed ecosystems. Food companies are increasingly becoming aware of these challenges and are looking for sustainable and accountable ways to adapt their business models. One approach is to incorporate sustainability into business strategy and planning. Sustainability is a conceptual framework. It integrates ecology, economics, politics and culture. Given the connection to the entire food production process from farm to fork, food safety professionals are poised to lead in sustainability. Many of the systems already developed to detect, prevent and trace contamination can be retooled and applied towards sustainability.

Elements of preventive food safety programs could be adapted to cover environmental and social benchmarks. Partnering to solve any challenges sustainably from the way we operate, to the products we develop, to how we serve consumers, our safety goal should be zero: zero accidents, zero

Co-management is science-based, adaptive and collaborative way offers solutions by minimizing the risk of faecal contamination and the resulting microbiological hazards associated with food production while simultaneously conserving soil, water, air, wildlife and other natural resources. It is a decision making issue.

Scientist,
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The ISO/IEC 17025: 2017- the major changes and challenges for implementation

Mohammed Abbas Alam

This document specifies the general requirements for the competence, impartiality and consistent operation of laboratories. This document is applicable to all organizations performing laboratory activities, regardless of the number of personnel. Laboratory customers, regulatory authorities, organizations and schemes using peer-assessment, accreditation bodies, and others use this document in confirming or recognizing the competence of laboratories. Earlier the standards were published as guide 25 in 1995. The 1st edition of ISO/IEC 17025 published in 1999. The 2nd edition published in 2005 and the 3rd edition was in November 2017. The present version of standards given flexibility to the conformity Assessment bodies and the risk based approach used in the 2005 edition and focused that a single man show laboratory can get the accreditation.

- A complete restructuring of the clause numbers: The standard now follows the standard 'conformity assessment' structure as used in publications such as ISO/IEC 17020 for Inspection bodies and ISO 9001:2015. The document is now much more logical in its approach, with the 'core business processes of receiving requests through to issuing reports laid out in a pretty much sequential manner. Support and management aspects are also largely grouped together and some of the wording simplified.

- Interaction with ISO 9001: Again, as per standards like ISO/IEC 17020, the standard identifies overlaps between ISO/IEC 17025 and ISO 9001, so if the laboratory is part of an ISO 9001 certified organization it will be easier to integrate business management systems. For that reason the inception of option A and B which will be given flexibility for quality management system part. This was very difficult to do with the 2005 version.

- Terms and definitions: In the definitions the Method verification and Intra-laboratory comparison included which was not clearly defined in 2005 version.

- Impartiality risk assessment: A major enhancement involves requiring the laboratory to conduct an assessment of risks to its impartiality, as opposed to just demonstrating that it is impartial. This will require some work to be done for most organizations that will now be required to perform such an assessment, mitigate any identified risks and periodically review risks.

- Handling of confidential information: As with the requirement on complaints, the standard has been 'beefed up' in terms of aspects of confidentiality, again, laboratories will have to review their existing processes to ensure compliance, although it is not anticipated that this will require much in the way of practical changes to day to day operations.

- Customer complaints: Although already covered in the 2005 edition of the standard, the 2017 edition includes far more detail on what has to be covered in the laboratory's 'documented process' for complaint handling. Whilst this should not represent much of a change for most organizations, a review will be required to be made to ensure current procedures reflect all of the new requirements.

- Risks and opportunities: The old clause on 'Preventive Action' has been replaced with a risk-based approach, as is the case with the change introduced in ISO 9001: 2015. This requires that the laboratory considers the 'risks and opportunities associated with the laboratory activities'. This will certainly serve to remove the ongoing confusion surrounding the mysterious differences between 'Corrective' and '

Preventive' actions, but will require most laboratories to put some considerable thought into identifying risks and mitigating them as well as identifying opportunities leading to improvement. Any such risk/opportunity assessments will be required to be linked to other monitoring systems (such as audits, non-conformance and corrective action systems) and periodically reviewed.

- Internal audits: Not much has changed in this requirement other than standard being more 'risk-based', with internal audits being based on 'importance of activity' as opposed to the old requirement of auditing each 'element' of the standard, although of course it is expected that accreditation bodies will still expect this to be done. Also the present version of standard does not mention anything about the training and qualification of auditors.
- Management review: Some minor changes have been added to the 'input' requirements, meaning and update to management review agendas to include aspect such as changes in internal and external issues, fulfillment of objectives, and effectiveness of improvements and results of risk identification.
- Data and Information management systems: A separate section has been added regarding this topic which replaces the original '5.4.7 Control of data' clause and some aspects of record management though it is relevant to the clause 4.13.1 control of general records of ISO/IEC 17025:2005 versions. This brings the standard much more in line with current practices in use of computerized systems, but probably only really asks for what Accreditation bodies already expect in the way of controls.

The present edition of standard is very much challenging for "Conformity Assessment Bodies (CABs)" as well as "Accreditation Bodies". Because in the current edition given flexibility in some area such as documentation and in resources. The 2005 edition it was mandatory for the laboratory to prepare a "Quality Manual" and "Quality Policy". But the current version does not tell anything about quality manual and quality policy though the CABs can practice this continuously for good documentation system. However, the present version does not define clearly about the "Quality Manager and Technical Manager".

I am sure that the "Conformity Assessment Bodies" in all over the world especially in Bangladesh are in terrible situation about implementation of current version of standard ISO/IEC 17025:2017. My message to all of you, since there is no major changes in the current version of standard so no need to prepare new documents except risk assessment and opportunities for improvement. Just align the clauses in Quality Manual and other documentation system as per new standard and start implementation accordingly.

The International Laboratory Accreditation Cooperation (ILAC) and the Asia Pacific Laboratory Accreditation Cooperation (APLAC) have already defined three years transition period from the date of publishing the standard. BAB will establish a plan very soon and it will be communicated to the existing and potential clients, regulatory and statutory bodies and other interested parties for executing the transition period of ISO/IEC 17025:2017.

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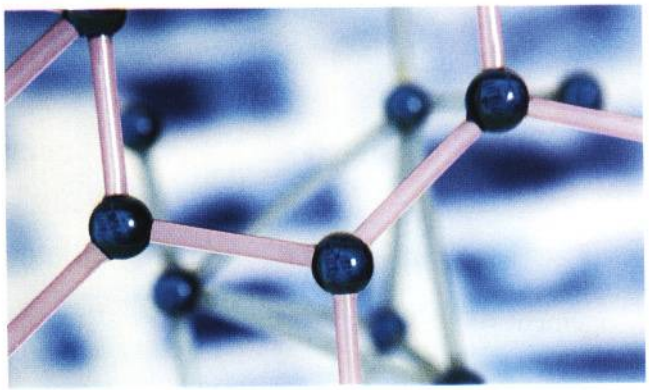

COMPITATIVE LABORATORY, BANGLADESH PERSPECTIVE

Md. Zakaria Chowdhury

Bangladesh is on the list of developing country. Our industrial sector rapidly developing. We are exporting garments product, knitwear, agricultural products, frozen food (fish and seafood), jute and jute goods, leather etc. In order to win the faith of the buyers, we need to export products with exact specifications and maintain a standard.

Every export products need a quality control certificate. This need to conducts some lab testing before it goes outside of the country. Such as, garments or knitwear products need some textile testing, agricultural or food products need to be tested for pesticide or microb or for heavy metals. Construction products need to be tested for their tensile strength. In most cases we have laboratories to perform test. We do testing and certify our product. When a product exported, buyer conduct a lab test in their country. If test result matches the value with that of ours then the byer can keep faith on our product. But in most cases foreign test results does not match with our results and still now buyers do not relay on our test results. Why not? Because in most cases we don't have require facilities in our labs. Though, with time our facility is developing, but still we are not capable of producing competitive results. Why not? Because most testing laboratories don't follow international standard. These unreliable test results make the buyers dejected.

In recent days, some cement factories in our country are advertising that their products are "BUET tested"! Is this ok for the buyers? do they rely on "BUET test"? They don't know what "BUET tested" means and neither they know why we refer to this. They know the standard that follows ISO. If a company writes that they tested their products from some ISO accredited lab, then that test result might be reliable for the buyer. We have very few accredited labs. Although we have some competitive and accredited labs for the textile but there exists severe lacking in competitive food testing labs.

Not only for export product, we need to follow standard tasting for our own survival. Such as food safety is a big issue for the future of our nation. Food we buy from local market, might be it is contaminated with heavy metals or pesticides. If we continue consuming contaminated food, our future generation will face serious health problems. To consume quality food, we need to eliminate contaminated food form the market. Recently food safety authority has taken some initiatives. But to make them successful we need many competitive laboratories for food testing.

Till today, Bangladesh has only one board- Bangladesh Accreditation Board, that can certify lab for standardization. To setup competitive test labs government have to take some initiatives so that testing lab can make themselves accredited. And accreditation boards needs to be strong and free from corruption.

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Qulity Infrastructure and Accreditation Scenario in Europe: A perspectival contrast with Bangladesh

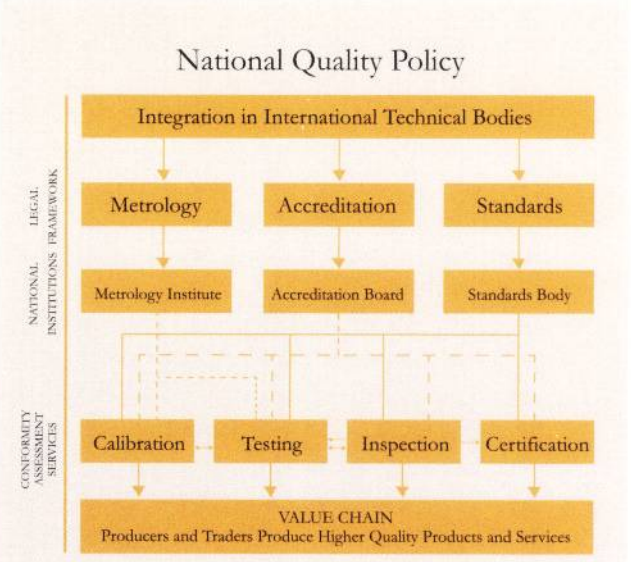
Monirul Hoque Pasha

Quality Infrastructure represents a complex array of systems, norms, regulations and related institutions of an economy (country), for ensuring that products marketed for internal customers comply with desired requirements of public interest including quality, safety, health and environmental requirements. These products can be manufactured nationally or imported from abroad. It is therefore the infrastructure that lays out the rules of the game for public and private agents in order to safeguard and protect the health and safety of society, the legitimate interests of the consumers etc. In broad terms a Quality Infrastructure system consists of numerous interlinked areas of activity including development of technical regulations, standardization, conformity assessment, accreditation, legal and scientific metrology and market surveillance.

Each element of the Quality Infrastructure system is intended, in synergy with others, to promote economic efficiency and enhance welfare. However incompatibilities and conflicts of interests that exist both between and within industries and, most importantly, across national frontiers can give rise to serious non-tariff barriers, more commonly known as Technical Barriers to Trade. Against these considerations, public authorities across the world are increasingly recognizing the advantages of aligning National Quality Infrastructure (NQI) systems on multilateral and regional basis. In Europe, a strong intellectual and technical basis in the field of Quality Infrastructure has been developed i.e., strong co-operation with various standardization, accreditation and related bodies are in existence.

Accreditation, an important element of Quality Infrastructure, now becomes clearly a governmental matter in Europe. Unique designated national accreditation bodies (ABs) are in charge of assessments and accreditation of conformity assessment bodies (CABs).

So does in Bangladesh. The idea behind is, accreditation serving as the last level of competence in a uniform chain of conformity assessment activities in a global marketplace. All ABs shall act not for profit, but serve the need of the particular country facilitating larger profitability of its economy. Similarly, standardization and metrology institutes are working as part of governmental matter. However, Bangladesh is yet in process of idealizing the situation and modernizing the system for NQI institutions. Bangladesh National Quality Policy (BNQP), recently adopted by the government has addressed this issue and underpinned the need of effective technical regulation framework (TRF) aligning all technical regulators in line with NQI institutional tasks.



How national quality infrastructure works under a policy strategy;
Source: http://www.cpqi-consulting.com/topics/quality-infrastructure/

BNQP also pin-pointed the necessity of building a new institution – to be named as Bangladesh National Quality and Technical Regulation Council (BNQTRC) that would formally coordinate amongst the NQI and TRF institutions. A new project under GoB funding has been taken with primly goals for enactment of an act and formulation of such institute under the act. It is interesting to form an institution that will be coordinating many a more NQI and TRF institutes working in diversified fields, to name a few- food, drug, health, environment, transport, clothing, radiation, agriculture, fisheries, IT/telecom sectors, and so on. Isn't it an extravagant system? Would it really be going to fulfill the main objectives while the new institutes will be working under the Ministry of Industries? In contrast, there is an absence of such institute in Europe for merely coordination among various NQI and TRF institutes. The reason might be presence of ensuring impartiality, completeness and technical competence that are the central for institutes in Europe. As such, the institutional culture is developed on mutual trust and confidence, and the local, regional and international trades are driven by high professionalism and ethics.

In Bangladesh, our approach is deeply rooted on the premise that a modern Quality Infrastructure and Technical Regulation system should not work with a coordinating office. This institution might not solve the existing problem of non-harmonization or non-coordination occurring among NQI and TRF institutions, rather may make burden on government and increase the bureaucracy. Across our efforts, we must think particularly the emphasis in working closely with both in the public and private sector, which should be viewed as critical to the sustainability of our work.

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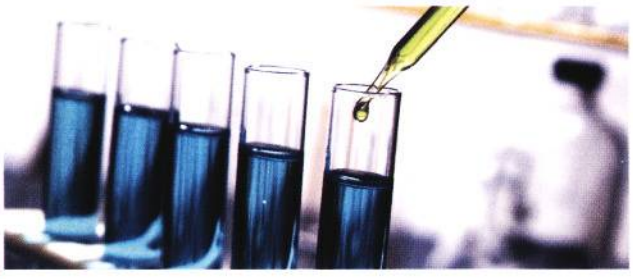
Metrological Traceability of Measurement Results in Pharmaceutical Testing Laboratory

Kamal M Ali

Introduction

Testing laboratories produce test results. The test result is the product of a process of sampling and measuring. The theoretical goal of a chemical analyst is to strive for a True Value. A True Value would only be obtained by a perfect measurement. But achieving this value is close to impossible since a perfect measurement does not exist. According to Bièvre, 1,2 "a measurement is always a comparison". Therefore, it is necessary to have a reference, which can be a measurement unit, a measurement standard (calibrator, called certified reference material or CRM) or a measurement procedure. Users of laboratory data always seek comfort that the measurements used to produce the results are "traceable."

In practice traceability can mean many things to many people, but to an accredited laboratory and reference material producer, it is very specific. Metrological traceability is defined as the "property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty".3 It is essential to ensure that measurement results are comparable in time and space. 4. This can be exemplified such way that the laboratory measuring instrument was compared to other instruments which, in turn were compared to others, and so on… all the way back to a national measurement laboratory – and that the results of those comparisons produced a Calibration Certificate which describes certain properties about the measuring instrument.



Metrological traceability in pharmaceutical testing laboratories

Traceability of chemical metrology can be more precisely defined as a property of the result of a measurement, either physical or chemical, or the value of a standard whereby it can be related, with a stated uncertainty, to stated references, usually national or international standards, through an unbroken chain of comparisons.

The mole corresponds to the ratio between the mass of a certain sample amount and its atomic or molecular mass. 5 The metrological traceability in chemical testing laboratories is ensured mainly by using: (i) a measurement procedure that can provide accurate and metrologically traceable results, (ii) calibrated equipment/system, or (iii) certified reference materials (CRM) (measurement standard).6 . In 2013, the International Laboratory Accreditation Cooperation (ILAC) has published the ILAC P10:01, 7 which describes who should perform calibration of equipment and reference standards. The options include, but are not limited to, calibration laboratories accredited under ISO 17025:2005 by an accreditation body (AB) covered by the ILAC Arrangement, as well as National Metrology Institutes (NMI) whose services can be found in the BIPM key comparison database (KCDB).

Another option is to perform calibrations based on physical constants and measurements. Measurement uncertainty and metrological traceability are interdependent concepts. 8,9. The expression of uncertainties is necessary to indicate to which extent calibration and testing measurement results can be relied on. 10. Without this indication, measurement results cannot be compared among themselves or with reference values. 11 This means that the measurement uncertainty has to be taken into account whenever the result will be compared with others and lead to a decision such as "pass versus fail" or "accept versus reject". 12

Certified reference materials (CRM)

A certified reference material is a "reference material characterized by a metrologically valid procedure for one or more specified properties accompanied by a certificate that provides the value of the specified property, its associated uncertainty, and a statement of metrological traceability". 6 Based on this definition, the first things that the user has to check in the CRM certificate are the declaration of the certified property value (e.g., amount of substance in a given mass of material), the uncertainty associated to this property value, and also how the material was characterized to ensure metrological traceability. According to the ISO Guide 35:2006, 13 the metrological traceability of a CRM property value can be ensured by using (i) a single (primary) method, (ii) two or more independent reference methods in one laboratory, (iii) a network of laboratories using one or more methods of demonstrable accuracy, or (iv) a method-specific approach giving only method-specific assessed property values, using a network of laboratories,

The necessary steps for the certification of reference materials are given by the ISO/IEC 17034:2010 and ISO Guide 35:2006. 6, 13. Reference material producers usually need several months or even years to conclude the whole procedure. The most important steps are the homogeneity studies. Which is carried out in a battery of experiments to verify (in) homogeneity within and between flasks, the short- and long-term stability studies, carried out at transportation and storage conditions, respectively, the characterization of the CRM candidate material to assign the CRM property value, as well as the estimation of uncertainties in all steps and their combination to determine the standard uncertainty of the CRM property value.

ISO/IEC 17034 –Benchmarking Suppliers

Now a day many of business, medical and legal decisions are being made based upon chemical measurements. This exerts more pressure on the analyst to produce accurate and reliable data to defend a given decision, explain an occurrence, plan the future or predict an outcome.

Inaccurate CRMs always lead to inaccurate data resulting in poor decisions. So there is a demonstrated need to use CRMs to comply with byres' or legal requirements. Now many companies require that their analysts and suppliers use certified reference materials (CRMs) that are produced by an ISO/IEC 17034 accredited reference material producer (RMP). Considering critical to the accuracy of its data, laboratories are using CRMs in several capacities including the calibration of testing equipment, validation of test methods and as quality control samples. The laboratory personnel of pharmaceutical laboratory should bear in mind that RM does not substitute a CRM. The reason behind this lies in the traceability. A RM will not guarantee that the analytical results are metrologically traceable. In the chemical testing laboratory non-certified reference materials may be used for trend monitoring of analytical measurements performed along the time, in order to check if the process is under control, but shall not be used in analytical procedures aiming to provide accurate measurement results.

Pharmaceutical laboratory manager should consider at least the things before selection of a RMP provider

- Confirm that RMP is accredited to ISO/IEC 17034 through visiting website of accreditation body. A CRM manufacturer claiming adherence to ISO/IEC 17034 requirements, but is not accredited may not meet your company's requirements.
- Confirm that you are purchasing a Certified Reference Material CRM and not a noncertified Reference Material (RM). The third edition of Guide 34 has provided for the production of noncertified Reference Materials. The production of RMs leaves CRM requirements, such as a purity characterization of the material, stability assessment, the assignment of a property value and uncertainty and metrological traceability, up to the discretion of the RMP. If you decide to purchase a RM rather than a CRM make certain that you have checked with you Quality Manager otherwise you may find yourself in non-compliance at audit time.

- Confirm that the CRM you intend to purchase is included in the Scope of Accreditation. An RMP is accredited to ISO Guide 34, but this does not mean that all of the products are produced according to the requirements for a CRM. Therefore, finding a product on the Scope of Accreditation is critical. Hopefully the RMP will make this process easy for you.

- Check a sample certificate of analysis to make certain that your areas of key importance have been addressed to your satisfaction, and to that of your Quality Manager. If you are still not sure after inspecting a sample certificate, ask for the actual Certificates of Analysis to be sent for your approval prior to purchase. This should be available for all stock products.

- If you have technical questions about the applicability of the CRM to the intended use, ask the RMP. Remember that there are no bad questions.

- For aqueous atomic spectroscopic CRMs, confirm that the expiration date meets your accuracy requirements by weighing the CRM one month after opening, and then by calculating the % increase in concentration at the expiration date. A long expiration date may wind up costing much more than is saved.

Conclusions

The metrological traceability is the technical basis of the ISO 17025:2005 standard and it is necessary to guarantee that calibration and testing laboratories can perform accurate and reliable equipment calibration or provide accurate analytical measurement results, respectively.

This can be done by creating a metrological traceability chain between the laboratories standards and a primary reference standard (e.g., mass prototype or CRMs) or by using of physical constants in calibrations. The uncertainties increase downstream along the traceability chains and are essential to inform how much the results can be relied on.

The availability of CRMs is still quite limited and does not fulfill the demands of the laboratories. Therefore, it is essential to encourage worldwide the accreditation of reference material producers under the ISO/IEC 17034:2010 and the production of new CRMs.

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এ্যাক্রেডিটেশনঃ চতুর্থ শিল্প বিপ্লবের সুফল ভোগের হাতিয়ার

মোঃ আব্দুল জলিল

শিল্পায়ন একটি ধারাবাহিক প্রক্রিয়া। এটি একটি জ্ঞানভিত্তিক অভিযাত্রা। যুগে-যুগে এমনকি শতাব্দীর ব্যবধানে শিল্পায়নের গতিধারা পরিবর্তন হয়েছে। শিল্পায়ন প্রক্রিয়ায় ক্রমেই আধুনিকতার ছোঁয়া লেগেছে। মানবসভ্যতার শুরুতেই শিল্পায়নের সূচনা হয়েছিল। এক সময় যখন মানুষ গুহায় বসবাস করত, তখনও পশুপাখি শিকারের জন্য পাথর দিয়ে তৈরি ধারালো অস্ত্র ব্যবহার করত। পরবর্তীতে গুহার পাশে কৃষি আবাদের জন্য মাটি খোঁড়ার কাজে যে যন্ত্র ব্যবহার হত, তাও শিল্প উৎপাদনেরই অংশ। মানবসভ্যতার বিকাশের পর উনবিংশ শতাব্দীতে প্রথম শিল্প বিপ্লবের সূচনা হয়। যোগাযোগের জন্য বাষ্পীয় ইঞ্জিন আবিষ্কার, ছাপাখানা ও টেলিগ্রাফ মেশিনে স্টিম পাওয়ারের ব্যবহার, কয়লাভিত্তিক শক্তি উৎপাদন ইত্যাদির মাধ্যমে প্রথম শিল্প বিপ্লব এগিয়ে গিয়েছে।

উনবিংশ শতাব্দীর শেষ দিকে কেন্দ্রিভূত বিদ্যুতায়ন, টেলিফোন, রেডিও, টেলিভিশন আবিষ্কার, সুলভ মূল্যে তেলের যোগান এবং জাতীয় পর্যায়ে যানবাহন চলাচলের জন্য অভ্যন্তরীণ যোগাযোগ অবকাঠামো গড়ে ওঠার মাধ্যমে দ্বিতীয় শিল্প বিপ্লবের সূচনা হয়। এর প্রভাবে ধীরে ধীরে শিল্পায়ন প্রক্রিয়া আধুনিক ও প্রযুক্তিনির্ভর হতে থাকে। এরপরই ইউরোপে তৃতীয় শিল্প বিপ্লবের সূচনা হয়। এটি হলো ডিজিটাল কমিউনিকেশন ও ইন্টারনেট অবকাঠামোভিত্তিক একটি শক্তিশালী শিল্প বিপ্লব। এতে নবায়নযোগ্য জ্বালানির ব্যবহার ও উৎপাদন প্রক্রিয়ায় সবুজ প্রযুক্তি প্রয়োগের ওপর গুরুত্ব দেয়া হয়েছে। পাশাপাশি উৎপাদন ও বিপণন প্রক্রিয়ায় ইন্টারনেট টেকনোলজি এবং পরিবেশবান্ধব সবুজ জ্বালানি ব্যবহার বৃদ্ধির প্রয়াস দেখা গেছে।

এ শিল্প বিপ্লবের সুফল পেতে পৃথিবীর প্রায় সকল দেশে নবায়নযোগ্য সবুজ জ্বালানির ব্যবহার বাড়ছে। পাশাপাশি উৎপাদন প্রক্রিয়ায় আধুনিক তথ্য প্রযুক্তি ব্যবহার বৃদ্ধি পাচ্ছে। এর মাধ্যমে বিশ্বব্যাপী সবুজ ও মূল্য সংযোজিত (Green & Value-added) পণ্য উৎপাদনের প্রয়াস বেগবান হচ্ছে। উৎপাদিত পণ্য যাতে মানসম্মত হয় এবং কোনোভাবেই স্বাস্থ্যের জন্যই ক্ষতিকর না হয়, তার প্রতিও সবাই বিশেষভাবে লক্ষ্য রাখছে। এর জন্য উন্নত দেশগুলো স্থানীয় পর্যায়ে উদ্ভাবন ও সৃজনশীল প্রতিভার বিকাশে ক্রমাগত পৃষ্ঠপোষকতা দিয়ে যাচ্ছে।

এখন চতুর্থ শিল্প বিপ্লব হাতছানি দিচ্ছে। এটি হচ্ছে মোবাইল সফ্টওয়্যারভিত্তিক একটি শক্তিশালী বিপ্লব। একটি উদাহরণের মাধ্যমে এটি পরিস্কার করা যাক। ১৯৯৮ সালে বিশ্বখ্যাত ফটো-পেপার প্রস্তুতকারী প্রতিষ্ঠান কোডাক বিশ্বের ফটো পেপারের চাহিদার শতকরা ৮৫ ভাগ উৎপাদন করতো। সে সময় এ প্রতিষ্ঠানে ১ লাখ ৭০ হাজার জনবল ছিল। ডিজিটাল ফটোগ্রাফি আসার ফলে কোডাক এখন দেউলিয়া হয়ে গেছে। এর কর্মচারীরা চাকরি হারিয়েছে। Airbnb হচ্ছে বিশ্বের সবেচেয়ে বড় হোটেল কোম্পানি। কিন্তু তাদের নিজস্ব কোনো হোটেল নেই। শুধুমাত্র সফ্টওয়্যার ব্যবহার করে এসব কোম্পানি নিজ নিজ সেক্টরে একচেটিয়া ব্যবসা করছে।

যুক্তরাষ্ট্রের IBM Watson সফ্টওয়্যার মুহূর্তের মধ্যে আইন সংক্রান্ত নির্ভুল লিগ্যাল এড্ভাইস দিচ্ছে। ফলে নতুন আইনজীবীরা এখন ক্লায়েন্ট খুঁজে পাচ্ছে না। Watson সফ্টওয়্যার ব্যবহার করে মানুষের তুলনায় চারগুণ নির্ভুলভাবে মানবদেহের ক্যান্সার শনাক্ত করা যাচ্ছে।

চলতি ২০১৮ সালে রাস্তায় চালকবিহীন গাড়ি নামবে। ২০২০ সালে চালকবিহীন গাড়ি বিশ্ব সড়ক যোগাযোগের ক্ষেত্রে আমূল পরিবর্তন নিয়ে আসবে। ২০৩০ সালের মধ্যে ৯০ শতাংশ ড্রাইভার চালিত গাড়ি রাস্তা থেকে উধাও হয়ে যাবে। আগামী ২০৩০ সালের মধ্যে কম্পিউটার মানুষের চেয়ে বেশি Intelligent হবে। রোবটিক টেকনোলজি, কৃত্রিম বুদ্ধিমত্তা, ন্যানো- টেকনোলজি, বায়ো-টেকনোলজি ইত্যাদি প্রয়োগের মাধ্যমে বিভিন্ন শিল্পখাতে যে অসাধারণ পরিবর্তন পরিলক্ষিত হচ্ছে, তাই হলো চতুর্থ শিল্প বিপ্লবের অনিবার্য ফল।

শিল্প বিপ্লবের পথ ধরে শিল্পোন্নত দেশগুলোর মত স্বল্পোন্নত দেশগুলোও হাঁটছে। তবে শিল্পোন্নত দেশগুলো যে গতিতে এগিয়ে যাচ্ছে, অন্যরা সে গতিতে এগুতে পারেনি। এর কারণ স্বল্পোন্নত ও উন্নয়নশীল দেশগুলোতে সৃজনশীল উদ্ভাবন ও মেধা বিকাশে বিনিয়োগ কম। গবেষণা ও উন্নয়নখাতে (R&D) তাদের বিনিয়োগের পরিমাণ খুবই সীমিত। সঙ্গতকারণে উন্নয়নশীল দেশগুলোতে গুণগত শিল্পায়নের লক্ষ্য অর্জনে শ্লথ গতি পরিলক্ষিত হচ্ছে। শিল্পোন্নত দেশগুলো যেখানে চতুর্থ শিল্প বিপ্লবের সুফল অর্জনে ব্যস্ত, সেখানে এলডিসিভুক্ত দেশগুলো এখনও তৃতীয় শিল্প বিপ্লবের ধারায় পুরোপুরি সম্পৃক্ত হতে পারেনি। তবে এর ব্যতিক্রমও আছে। সেক্ষেত্রে বাংলাদেশকে উদাহরণ হিসেবে তুলে ধরা যায়। বাংলাদেশের মানুষ দ্রুত অভিযোজনের (Adaptation) ক্ষমতা রাখে।

যে কোনো প্রযুক্তিগত পরিবর্তনের সাথে খাপ খাইয়ে নিতে এ দেশের মানুষের জুড়ি মেলা ভার। মোবাইল ফোন ও ইন্টারনেট ব্যবহার, ফেসবুকিং ইত্যাদির ক্ষেত্রে বাংলাদেশের সাম্প্রতিক ঈর্ষনীয় অগ্রগতির প্রবণতা এর বড় প্রমাণ।

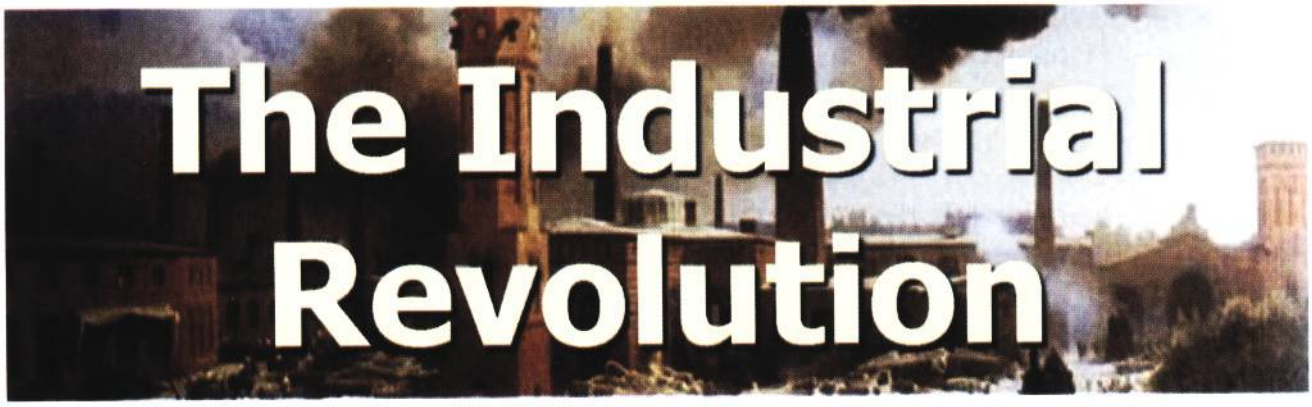
ফলে গত প্রায় এক দশকে বাংলাদেশের শিল্পায়নে ব্যাপক পরিবর্তন লক্ষ করা গেছে। উৎপাদন ব্যবস্থাপনায় আধুনিক প্রযুক্তির প্রয়োগ উল্লেখ্যযোগ্য হারে বেড়েছে। দেশের শিল্পখাত ক্রমেই প্রযুক্তিনির্ভর হতে চলেছে। শিল্পখাতে মেধা, সৃষ্টিশীলতা ও সৃজনশীল উদ্ভাবনের সমন্বয় ঘটছে। নতুন প্রজন্মের শিল্প উদ্যোক্তারা জ্ঞানভিত্তিক শিল্পায়নের অভিযাত্রায় দ্রুত সামিল হচ্ছে। টেকসই ও পরিবেশবান্ধব সবুজ প্রযুক্তির প্রয়োগে উদ্যোক্তারা এগিয়ে এসেছেন। শিল্প ব্যবস্থাপনায়ও ব্যাপক গুণগত পরিবর্তন সূচিত হয়েছে। শিল্পখাতে উৎপাদনশীলতা আশাতীত হারে বেড়েছে। দেশের সামগ্রিক অর্থনীতিতে ক্রমবর্ধমান রপ্তানি আয় এবং রপ্তানিখাতে পণ্য বহুমুখীকরণের প্রভাব এখন দৃশ্যমান। এটি দেশের সামাজিক সূচকেও ইতিবাচক পরিবর্তন এনেছে। আন্তর্জাতিক সম্প্রদায় এ অর্জনের স্বীকৃতি দিচ্ছে। জাতিসংঘের মূল্যায়নে সম্প্রতি বাংলাদেশ এলডিসি থেকে উত্তরণ ঘটিয়ে উন্নয়নশীল দেশের তালিকায় অন্তর্ভুক্ত হয়েছে। ২০১৫ সালে বিশ্বব্যাংক এ দেশকে নিম্ন-মধ্যম আয়ের রাষ্ট্র হিসেবে স্বীকৃতি দিয়েছে। এসব অর্জনের পেছনে নির্দ্বিধায় শিল্পখাতের গুরুত্বপূর্ণ অবদান রয়েছে।

বৈশ্বিক শিল্পবিপ্লবের ধারা বিবেচনায় বাংলাদেশে এখন তৃতীয় শিল্প বিপ্লবের যুগে প্রবেশ করেছে। শিল্পসমৃদ্ধ ডিজিটাল বাংলাদেশ প্রতিষ্ঠার প্রয়াস এই শিল্প বিপ্লবেরই বাস্তবতা। ২০২১ সালের মধ্যে মধ্যম আয়ের বাংলাদেশ বিনির্মাণের স্বপ্ন সাফল্যের দ্বারপ্রান্তে। ২০৪১ সাল নাগাদ বাংলাদেশ হবে একটি উন্নত ও সমৃদ্ধ রাষ্ট্র। এ অভীষ্ট লক্ষ অর্জনে শুধু তৃতীয় শিল্প বিপ্লব নয়, চতুর্থ শিল্প বিপ্লবের সুফলও কাজে লাগাতে হবে। উৎপাদন ব্যবস্থায় প্রযুক্তির সফল প্রয়োগের মাধ্যমে শিল্পখাতে ব্যাপকহারে গুণগত পরিবর্তন আনতে হবে। উৎপাদিত পণ্য ও সেবার মান আন্তর্জাতিক পর্যায়ে উন্নীত করতে হবে।

নিজেদের উৎপাদিত পণ্য যাতে আন্তর্জাতিক বাণিজ্যের যে কোনো কারিগরি প্রতিবন্ধকতা (TBT) কিংবা অকারিগরি প্রতিবন্ধকতা (Non-TBT) অতিক্রম করে দাপটের সাথে টিকে থাকতে পারে, সে ধরনের সক্ষমতা বাড়াতে হবে। এক্ষেত্রে এ্যাক্রেডিটেশন একটি গুরুত্বপূর্ণ হাতিয়ার। একে বিশ্ববাণিজ্যের অন্যতম অনুসঙ্গ হিসেবেও বিবেচনা করা হয়।

স্বাভাবিকভাবেই প্রশ্ন আসে, এ্যাক্রেডিটেশন কী? কীভাবে এটি শিল্পখাতে গুণগত পরিবর্তন আনে? চতুর্থ শিল্প বিপ্লবের সুফল পেতে এর অবদান কী? খুব সহজে বললে, এ্যাক্রেডিটেশন হচ্ছে, কোনো পরীক্ষণ (Testing), পরিদর্শন (Inspection) এবং সার্টিফিকেশন (Certification) কার্যক্রমের তৃতীয় পক্ষীয় মূল্যায়ণ (3rd party attestation) দিয়ে সাজুয্য (Conformity) নিরুপণ করা। যে কোনো পণ্য বা সেবা উৎপাদনের মূল উদ্দেশ্য হলো ক্রেতা-ভোক্তাদের দৃষ্টি আকর্ষণ ও সন্তুষ্টি অর্জন। ক্রেতাদের প্রত্যাশা হচ্ছে, ক্রয়কৃত পণ্য বা সেবা সব সময় নিরাপদ ও গুণগতমানের হোক। যে চাহিদার জন্য তারা পণ্য বা সেবাটি কিনছেন, সে চাহিদা ও প্রত্যাশা যথাযথভাবে পূরণ হোক। যাকে ইংরেজিতে বলা যায়, Fit For Use। আর অন্যদিকে পণ্য উৎপাদকরাও চান, তাদের উৎপাদিত পণ্য বা সেবা ব্যবহার করে ক্রেতা-ভোক্তারা সন্তুষ্ট হোক। অর্থাৎ ক্রেতা-ভোক্তাদের Satisfaction পূরণ করুক। আর এ্যাক্রেডিটেশন পদ্ধতি এ প্রত্যাশা ও প্রাপ্তির মধ্যে সমঝোতা করে থাকে।

এ্যাক্রেডিটেশন পণ্য ও সেবার গুণগতমানের নিশ্চয়তা বিধান করে। পণ্যটি বিশ্বের যে কোনো দেশের একটি এ্যাক্রেডিটেড ল্যাবরেটরিতে পরীক্ষিত হলে, তা বিশ্বের সকল দেশে সমানভাবে গ্রহণযোগ্য হয়। কোনো পণ্য একবার এ্যাক্রেডিটেড ল্যাবরেটরিতে পরীক্ষিত (Tested) হলে, সেটি বার বার পরীক্ষা (Test) করার প্রয়োজন হয় না। অর্থাৎ এ্যাক্রেডিটেশন মানেই হচ্ছে, Tested once, accepted everywhere। এতে সময় ও অর্থের দুটোই সাশ্রয় হয়। ক্রেতা-ভোক্তা ও উৎপাদকের মধ্যে আস্থা (Confidence) বাড়ায়। পণ্যের গুণগতমান নিশ্চিত করে। প্রতিযোগিতায় টিকে থাকার সক্ষমতা বাড়ায়। এভাবে এ্যাক্রেডিটেশন আন্তর্জাতিক বাণিজ্যকে গতিশীল করে। বাণিজ্যের কারিগরি প্রতিবন্ধকতা দূরীকরণেও এটি ইতিবাচক অবদান রাখে।



নিরাপদ বিশ্ব গড়ে তোলার ক্ষেত্রেও এ্যাক্রেডিটেশনের ভূমিকা অনন্য। নিরাপদ বিশ্ব ব্যবস্থার জন্য প্রয়োজন নিরাপদ অবকাঠামো ও উৎপাদন পরিবেশ। এ্যাক্রেডিটেশন ব্যবস্থা মানুষের জন্ম থেকে মৃত্যু পর্যন্ত যা কিছু প্রয়োজন, তার সবই নিরাপদ ও স্বাস্থ্যসম্মতভাবে তৈরির নিশ্চয়তা প্রদান করে। এটি উৎপাদন প্রক্রিয়ায় বিশ্বব্যাপী স্বীকৃত মান অনুসরণ নিশ্চিত করে। ফলে জননিরাপত্তা জোরদার হয়। সুষম ও দক্ষ বাজার ব্যবস্থা গড়ে ওঠে। পরিবেশবান্ধব শিল্পায়নের ধারা বেগবান হয়। তাই জীবনের জন্য এ্যাক্রেডিটেশন ধারণা বিশ্বব্যাপী ক্রমেই জনপ্রিয় হচ্ছে।

অতীতে বাংলাদেশে এ ধরনের কোনো এ্যাক্রেডিটেশন কর্তৃপক্ষ ছিল না। ২০০৬ সালে বাংলাদেশ এ্যাক্রেডিটেশন বোর্ড (বিএবি) গঠিত হয়। বাংলাদেশ এ্যাক্রেডিটেশন আইন, ২০০৬ এর অধীনে গঠিত বিএবি জনবল নিয়োগের মাধ্যমে ২০১০ সাল থেকে কার্যক্রম শুরু করে। বর্তমানে বিএবি বাংলাদেশের একমাত্র এ্যাক্রেডিটেশন কর্তৃপক্ষ। জাতীয় এ্যাক্রেডিটেশন কর্তৃপক্ষ হিসেবে বিএবি দক্ষিণ এশিয়ার দেশগুলোর মধ্যে এটি সবচেয়ে নবীন সদস্য।

তবে সরকারের সার্বিক সহযোগিতা এবং প্রতিষ্ঠানের কর্মকর্তা-কর্মচারীদের নিরলস প্রচেষ্টার ফলে এটি দ্রুততার সাথে সকল শর্ত পূরণ করে আন্তর্জাতিক স্বীকৃতি অর্জন করেছে। বিএবি এখন এশিয়া প্যাসিফিক ল্যাবরেটরি এ্যাক্রেডিটেশন কোঅপারেশন (APLAC/এপলাক) এবং ইন্টারন্যাশনাল ল্যাবরেটরি এ্যাক্রেডিটেশন কোঅপারেশন (ILAC/আইলাক) এর পূর্ণ সদস্য। এটি ২০১৫ সালে এপলাক ও আইলাকের সাথে পারস্পরিক স্বীকৃতি চুক্তি (MRA) স্বাক্ষর করে। এর ফলে বিএবি এ্যাক্রেডিটেড প্রতিষ্ঠানগুলোর মানসনদ এপলাক ও আইলাকের সদস্যভুক্ত দেশগুলোতে প্রশ্নাতীতভাবে গ্রহণযোগ্য হচ্ছে।

অথচ একসময় এ্যাক্রেডিটেশন সনদ পাওয়ার জন্য বাংলাদেশি উদ্যোক্তাদেরকে ভারত, সিঙ্গাপুর, চীন, জাপান, ইংল্যান্ড, আমেরিকা, ডেনমার্ক, জার্মানিসহ অনেক উন্নত দেশে যেতে হতো। এখন দেশেই এ ধরনের সনদ প্রদানের ব্যবস্থা চালু হয়েছে। ফলে শিল্প উদ্যোক্তাদের মূল্যবান বৈদেশিক মুদ্রা সাশ্রয় হচ্ছে। ব্যবসায়ের লিড-টাইমও কমে আসছে। দেশিয় উদ্যোক্তারা আন্তর্জাতিক বাণিজ্যে দক্ষতার সাথে প্রতিযোগিতা করে নিজেদের পণ্য রপ্তানিতে সক্ষম হচ্ছেন।

তৃতীয় শিল্প বিপ্লবের ফলে সূচিত পরিবর্তনের সাথে খাপ খাইয়ে নিতে বাংলাদেশের সনাতনী প্রযুক্তির শিল্প-কারখানায় রূপান্তর ঘটেছে। দেশে উন্নত ও আধুনিক প্রযুক্তির শিল্প কারখানা গড়ে ওঠছে। এসব কারখানায় বিশ্বমানের পণ্য উৎপাদিত হচ্ছে। বাংলাদেশের তৈরি পোশাক বিশ্বে দ্বিতীয় স্থান দখল করে নিয়েছে। পাদুকা শিল্প বিশ্বে অষ্টম স্থান অধিকার করে আছে। এ দেশের ওষুধ ইউরোপ ও আমেরিকাসহ বিশ্বের ১৫১টি দেশে রপ্তানি হচ্ছে। বাংলাদেশে নির্মিত জাহাজ এখন ডেনমার্ক, জার্মানি, নেদারল্যান্ডস্, ফিনল্যান্ডসহ ইউরোপের দেশগুলোতে বিক্রি হচ্ছে। বাইসাইকেল ইউরোপসহ বিশ্বের ৩০টি দেশে রপ্তানি হচ্ছে। ইউরোপের দেশগুলোতে বাইসাইকেল রপ্তানিতে বাংলাদেশ তৃতীয় স্থানে ওঠে এসেছে। দেশে শিপ রিসাইক্লিং শিল্পখাত দ্রুত বিকশিত হচ্ছে। বাংলাদেশ এখন বিশ্বের জাহাজ পুনঃপ্রক্রিয়াজাতকরণ শিল্পে অগ্রগামী ৫টি দেশের অন্যতম হিসেবে আবির্ভূত হয়েছে।

চতুর্থ শিল্প বিপ্লব এখন আমাদের দোরগোড়ায় কড়া নাড়ছে। এর ফলে বৈশ্বিক শিল্প ব্যবস্থাপনায় ব্যাপক পরিবর্তন লক্ষ্য করা যাচ্ছে। উৎপাদন প্রক্রিয়ায় জ্ঞানভিত্তিক প্রযুক্তির দাপট দৃশ্যমান। এটা বাংলাদেশের জন্য একই সাথে চ্যালেঞ্জ এবং অযুত সম্ভাবনা সৃষ্টি করেছে। এ চ্যালেঞ্জে বিজয়ী হতে এবং উদ্ভূত সম্ভাবনা কাজে লাগাতে এ্যাক্রেডিটেশন হবে কার্যকর হাতিয়ার। এ্যাক্রেডিটেড ল্যাবরেটরি ও প্রতিষ্ঠানের সংখ্যা বাড়িয়ে এ শিল্প বিপ্লবের সুফল ভোগের প্রস্তুতি নিতে হবে। এখনই এ প্রস্তুতির সময়। অন্যথায় জাতি হিসেবে আমরা যে পিছিয়ে পড়ব, তা বলার অপেক্ষা রাখে না।

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How Accreditation helps delivering a safer world for us?

Md. Monwarul Islam

9 June marks World Accreditation Day, a global initiative, jointly established by International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC), to raise awareness of the importance of accreditation. The theme of World Accreditation Day 2018 focuses on how accreditation delivers a safer world.

Accreditation is the independent evaluation of various conformity assessment bodies against recognized standards to carry out specific activities such as laboratory testing, calibration, inspection or certification to ensure their integrity, impartiality and competence. Through the application of national and international standards, government departments, businesses and wider society can therefore have confidence in the calibration and test results, inspection reports and certifications provided.

The theme of this year talks about the expectation of safe workplaces, safe products, safe transport, safe food, safe housing, safe health in fact all aspects of our lives. Statistics however show that the expectation is not being matched by the reality. There are a vast range of ways that accreditation helps to deliver a safer world. Completed projects, raw materials, products, processes, services, management systems, and persons can be evaluated against a standard, code of practice, or regulatory requirement by accredited testing and calibration laboratories, inspection bodies, certification bodies and validation & verification bodies.

How Accreditation ensures Safe food and other products

The production and distribution of food and water involves complex supply chains and processes. Conformity assessment therefore provides a means for preventing unsafe, unhealthy or environmentally harmful products from entering the market place. Supermarket chains and food retailers should demand that their suppliers demonstrate that their products meet food and water safety standards by requiring accredited test reports, inspection reports and certifications. Food safety management system (ISO 22001) and other product certification accreditation against the standard respectively ISO/IEC 17021 and 17065 are required to demonstrate manufacturing and distribution of safe food and food products including meat, dairy, eggs, seafood or horticulture products and drinking water.

Safe Health

In order to deliver good health services, health regulators can impose some additional requirements to the health service providers such as clinics, hospitals, diagnostic centers and even to doctors and nurses. Accreditation allows healthcare organizations to demonstrate their ability to meet regulatory requirements and international standards. Accreditation reflects a health service provider's dedication and commitment to meeting standards that demonstrate a higher level of performance related to treatment and patient care.

Safe Housing

For safe building and housing, it is important to know the whether the construction materials to be used are safe or are those materials suitable for any specific use or of desired quality? Soil testing, testing of earthquake stability, construction materials' testing in accredited lab, accredited certification of materials production, accredited inspection of building works are the key to ensuring a safer housing.

Safe Workplace

Accredited occupation health and safety management system certification (ISO 45001 or OHSAS 18001) can be demonstration of ensuring safe workplaces. Providing a safe working environment should not be seen as a regulatory burden, but as a way to reduce costs, lower employee absence and turnover rates, suffer fewer accidents, lessen the threat of legal action, protect reputation for corporate responsibility among investors and customers, increase productivity through a healthier and better motivated workforce.

Safe Transport

For safety transport, it is necessarily to understod the potential danger in transportation of passengers and goods. Certification for Transport of people goods including dangerous goods is to provide a evaluation and advice about whether transport is safety or not. In general, certification needs to meet the requirements, which in accordance various international standards.

Safety is necessary for citizen of every country. Ensuring people's safety is the prime concern of the Government. So government and regulators are highly concerned to develop a system to ensure safe housing, working environment, health serv ice, food, transport etc for all. Because Safety first!

References

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2. http://ilac.org/
3. http://www.ponytest.com/Article/ShowInfo.asp?InfoID=553
4. https://achc.org/about-accreditation.html

Director General (Additional Secretary)
Bangladesh Accreditation Board (BAB)
dg@bab.org.bd

List of BAB Accredited Organizations

Sl. no.	Name of the CAB	Field/status
	Testing Laboratory (ISO/IEC 17025:2005)	
1.	Institute of National Analytical Research Services (INARS), BCSIR , Dhaka	Chemical Testing
2.	SGS Bangladesh Limited, Dhaka	Textile Testing
3.	AAA Corporation-Laboratory-01, Gazipur	Chemical Testing
4.	Interstoff Apparels Ltd. Laboratory (IALL), Gazipur	Textile Testing
5.	Fish Inspection and Quality Control (FIQC) Laboratory, Savar, Dhaka	Food Testing
6.	Textile Testing Services Ltd., Gazipur	Textile Testing
7.	Testing Laboratory, Dysin International Ltd., Dhaka	Textile Testing
8.	ITS Labtest Bangladesh Ltd., Tejgaon I/A, Dhaka	Textile Testing
9.	Concrete Innovation and Application Centre (CIAC), Holcim Cement (Bangladesh) Ltd., Dhaka	Mech. test of Aggregate and Concrete
10.	Lub-rref (Bangladesh) Ltd. Chittagong	Petroleum Product Testing
11.	Bureau Veritas Consumer Products Services (Bangladesh) Ltd., Savar, Dhaka	Textile Testing
12.	Nestle Sreepur QA Laboratory, Gazipur	Food Testing
13.	Fish Inspection and Quality Control (FIQC) Laboratory, Chittagong	Food Testing
14.	Fish Inspection and Quality Control (FIQC) Laboratory, Khulna	Food Testing
15.	Modern Testing Services (Bangladesh) Ltd., Savar, Dhaka	Textile Testing
16.	Bureau Veritas Consumer Products Services (Chittagong) Ltd.	Voluntary suspension
17.	ITS Labtest Bangladesh Ltd., Chittagong	Textile Testing
18.	Analytical Chemistry Laboratory, Atomic Energy Centre, Dhaka	Chemical Testing
19.	Central laboratory, Divine Fabrics Ltd., Gazipur	Textile Testing
20.	Petromax Refinery Ltd. Khulna	Petroleum Product Testing
21.	Central Laboratory, Samuda Chemical Complex Limited, Munshiganj	Chemical Testing
22.	TÜV SÜD Bangladesh (Pvt.) Ltd., Dhaka	Textile Testing
23.	Bangladesh Material Testing Laboratory Ltd., Dhaka	Construction material testing
24.	Quality Control Laboratory, Julphar Bangladesh Ltd., Gazipur	Pharmaceutical Testing
25.	NUSDAT-UTS, Walton Hi-Tech Industries Ltd., Gazipur	Electrical Testing
26.	PRAN Beverage Laboratory, PRAN Dairy Limited, Narshingdi	Food Testing
27.	Fakir Testing Services Ltd., Fatulla, Narayanganj	Textile Testing
28.	TAHA GIYIM Lab Bangladesh, Gulshan, Dhaka	Textile Testing
29.	SGS Food & Agricultural Testing Laboratory, Dhaka	Food Testing
30.	UL VS Bangladesh Ltd., Uttara, Dhaka	Textile Testing
31.	Plasma Plus Application and Research Laboratory, Uttara, Dhaka	Textile, Food, Pharmaceuticals and Environmental testing
32.	Brachi Testing Service (BD) Ltd., Kawan Bazar, Dhaka	Textile Testing

25.	NUSDAT-UTS, Walton Hi-Tech Industries Ltd., Gazipur	Electrical Testing
26.	PRAN Beverage Laboratory, PRAN Dairy Limited, Narshingdi	Food Testing
27.	Fakir Testing Services Ltd., Fatulla, Narayanganj	Textile Testing
28.	TAHA GIYIM Lab Bangladesh, Gulshan, Dhaka	Textile Testing
29.	SGS Food & Agricultural Testing Laboratory, Dhaka	Food Testing
30.	UL VS Bangladesh Ltd., Uttara, Dhaka	Textile Testing
31.	Plasma Plus Application and Research Laboratory, Uttara, Dhaka	Textile, Food, Pharmaceuticals and Environmental testing
32.	Brachi Testing Service (BD) Ltd., Kawan Bazar, Dhaka	Textile Testing
33.	Amber Textile Services Ltd., Gazipur	Textile Testing
34.	SGS Bangladesh Limited, Chittagong	Textile Testing
35.	TÜV Rheinland Bangladesh PVT. Ltd., Gulshan, Dhaka	Textile testing
36.	Quality Control Laboratory (Central Laboratory), Renata Limited, Mirpur, Dhaka	Pharmaceutical testing
37.	Quality Control Laboratory (Potent Product Facility), Renata Limited, Mirpur, Dhaka	Pharmaceutical testing
38.	Pesticide Analytical Laboratory (PAL), BARI, Gazipur	Chemical testing
39.	GMS Testing Laboratory, Gazipur	Textile testing
40.	Testing Laboratory, Impess-Newtex Composite Textiles Limited, Tangail	Textile testing
41.	Testing Laboratory, Qtex Solutions Limited, Uttara, Dhaka	Chemical testing
42.	Premier Testing Laboratory, Chittagong	Textile testing
43.	Comfit Lab Services Limited, Tangail	Textile testing
44.	Testing Laboratory, BSTI, Dhaka.	Biological, Chemical & Mechanical testing
45.	ACI Sourcing (BD) Pte. Ltd.	Textile testing
46.	National Control Laboratory (NCL)	Pharmaceutical testing
	Calibration Laboratory (ISO/IEC 17025:2005)	
47.	National Metrology Laboratory (NML-BSTI), Dhaka	Calibration (Length, Temperature, Mass, Volume, Pressure, Time and Frequency)
48.	Training Institute for Chemical Industries (TICI), Narshindi	Mechanical
49.	Calibration Laboratory, Dysin International Ltd., Dhaka	Voluntary suspension
50.	OTS (Pvt.) Ltd., Dhaka	Mechanical
51.	Instrumentation Engineering Services Ltd., Dhaka	Mechanical
52.	Resource Instrument & Measurement Enterprise (RIME), Dhaka	Thermal & Mechanical
	Medical Testing Laboratory (ISO 15189:2012)	
53.	United Hospital, Pathology Laboratory, Gulshan, Dhaka	Pathological Testing
54.	Pathological Laboratory, Labaid Limited, Dhanmondi, Dhaka	Pathological Testing
	Certification Body (ISO/IEC 17021:2011)	
55.	BSTI, Management System Certification Wing, Dhaka	Management System Certification
56.	United Certification Services Limited, Dhaka	Management System Certification
	Inspection Body (ISO/IEC 17020:2012)	
57.	Qtex Solutions Limited, Dhaka	Workplace Environment
58.	Envirotech International Ltd., Uttara, Dhaka	Workplace Environment

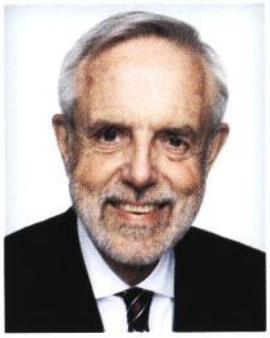
World Standards Day

Each year on 14 October, the members of the IEC, ISO and ITU celebrate World Standards Day, which is a means of paying tribute to the collaborative efforts of the thousands of experts worldwide who develop the voluntary technical agreements that are published as international standards.

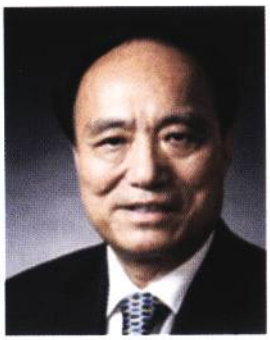
14 October 2018

International Standards and the Fourth Industrial Revolution

James M. Shannon
IEC President



John Walter
ISO President



Houlin Zhao
ITU Secretary-General

Just as standards were crucial during the first industrial revolution, over 250 years ago, they will also play a critical role in the fourth.

The Fourth Industrial Revolution refers to the emerging technologies, which are blurring the traditional boundaries between the physical, digital and biological worlds. This increased connectivity of people and things will impact the way we produce, trade and communicate, much like steam power transformed production methods and the way of life of many societies during the first Industrial Revolution.

In the 18th century, the transition from manual work to machinery and factory work raised the need for standards. For example, to replace machine parts and enable specialized mass production of components.

Today, standards will once more play a key role in the transition to a new era. The speed of change we are witnessing would not be possible without them. Innovators rely on International Standards, like those produced by IEC, ISO and ITU, to ensure compatibility and interoperability, so that new technologies can be seamlessly adopted. They are also a vehicle to spread knowledge and innovation globally.

The rapid pace of change brought by the Fourth Industrial Revolution has its challenges. Robots and artificial intelligence will take over more and more tasks previously done by humans, additive manufacturing (also known as 3D printing) will change the way we make goods, and give us the ability to "print things" at home, and as everything from planes to baby monitors are connected digitally, the vulnerability of data and the consequences of a breach are growing exponentially. These are only some examples of the issues presented by a new generation of smart technologies characterized by big data, increased integration, cloud storage and open communication of devices to name a few. International Standards are a powerful way to ensure safety and minimize risk. For example, security standards can keep our data safe and deter hackers. And safety standards for robots, will make it easier to interact with humans.

The Fourth Industrial Revolution has begun, but in order to seize its full potential for the betterment of society, standards are needed.

Case Study: **US Regulator uses accreditation to oversee imported food**

The U.S. Food and Drug Administration has adopted the use of accreditation in its oversight of imported foods. The FDA recognises accreditation under the voluntary Accredited Third-Party Certification Program.

Accreditation bodies recognised by FDA have the authority to accredit third-party certification bodies, which once accredited, can conduct food safety audits and issue certifications of foreign food facilities (including farms) and the foods – both human and animal – that they produce.

The FDA has also launched a Voluntary Qualified Importer Program (VQIP), a voluntary fee-based program which offers expedited review and entry of human and animal food into the United States. Importers interested in participating in VQIP will be required to meet a number of eligibility requirements, which include ensuring the facilities of their foreign supplier are certified under the Accredited Third-Party Certification Program.

Key Facts about the Accredited Third-Party Certification Program

Public Sector Assurance
About Contact

Case Study: **UK Food Regulator announces earned recognition for Welsh Lamb and Beef Producers feed standards**

The Food Standards Agency and Welsh Lamb and Beef Producers (WLBP) have signed a memorandum of understanding (MOU) that will result in a reduction in the frequency of animal feed inspections of members' farms by local authority trading standards officers from 1 April 2018.

The MOU recognises compliant businesses that are members of the Farm Assured Welsh Livestock (FAWL) scheme, which is underpinned by accreditation. It sets out the general principles of collaboration, cooperation, roles and responsibilities supporting the earned recognition process involving the FSA and WLBP. The FAWL scheme is operated by WLBP Ltd which is a cooperative owned by over 7,400 farmers.

Further information is available here.

Public Sector Assurance
About Contact

Case Study: **Supporting Food Chain Security**

European Regulation (EC) No 2017/625 relies on accreditation to support food security in Europe. It requires that all analytical results from laboratories that carry out Official controls must be accredited in accordance with ISO/IEC 17025. It also extends to the whole food chain, with more specific rules for dealing with fraud, including the obligation of Member States to carry out regular, unscheduled checks to ensure integrity and authenticity throughout the food chain.

The requirements for accredited laboratories are reflected in article 37, which directs the laboratory to include every one of the methods of analysis necessary for the realisation of Controls that are required, for example by operators.

Further information is available in the Regulation.

Public Sector Assurance

About Contact

Case Study: Accredited testing opens up meat export markets

Department for Environment Food & Rural Affairs

Manufacturing beef from the UK can now be exported to the Canadian market after approval was given by inspectors, following work involving the Agriculture & Horticulture Development Board (AHDB), Defra, the FSA, UK Export Certification Partnership (UKECP), Quality Meat Scotland and HCC Meat Promotion Wales.

The agreement covered both primal cuts and manufacturing beef, and UK officials have been working to ensure manufacturing beef is tested to the required microbiological standards required by the Canadian authorities. This regime is now in place and has been robustly evaluated to UKAS standards, allowing shipments to begin immediately.

Further information is available here.

Public Sector Assurance

About Contact

Case Study: Indian Textile Commissioner requires accredited certification

Office of the Textile Commissioner

The Textile Commissioner issued a circular dated 14 July 2017 which requires that the textile machinery manufacturers should hold an ISO 9001 certificate from an NABCB accredited certification body or its foreign office for enlistment by it. This circular applies to both Indian as well as overseas manufacturers of textile machinery.

Further information is available in the Official Circular:

Textile Commissioner_Circular No. 6 dated 14.07.2017

Public Sector Assurance

About Contact

Case Study: Accredited DNA testing supports Citizenship Processing

Australian Government

Department of Immigration and Border Protection

The Australian Department of Immigration and Border Protection (DIBP) requests that accredited laboratories providing DNA testing services for visa or citizenship purposes provide potential clients with transparent information regarding DNA testing fees. This is particularly relevant in an international context as DNA testing fees may not necessarily include payment to the offshore DNA sample collection facility.

The DIBP advises visa applicants that they are responsible for payment of the costs for DNA testing themselves, but transparency about the fee structure can help avoid the situation where clients find that there are additional costs for DNA sample collection that they were not aware of initially.

Further information is available on the Department's website.