

# Quality Control Laboratory Equipments – Maintenance and Calibration

Various kinds of equipments used in quality control laboratories for civil construction projects find mention in an earlier post in this blog. In this post maintenance and calibration of these equipments have been briefly discussed. Proper maintenance and periodic calibration of laboratory equipments is a very important aspect of the entire QC system itself for any construction project.

QC labs for construction projects primarily have three types of equipments: a) Inspection equipments e.g., theodolites, levels etc. b) Testing equipments e.g., electric ovens, concrete cube or cylinder crushing machine etc. and c) Measuring equipments e.g., digital or ordinary balance, digital or ordinary callipers, jars etc. The terms equipment, apparatus and instruments actually differ to some extent in meanings even though one is used in place of the other quite often. In here, the term equipment is used for all purposes for the sake of simplicity.

Obviously, not all elements of a laboratory need serious maintenance and not all of these need calibration either. For example, cube moulds need neither serious maintenance nor any calibration. While most need at least some maintenance, only a select few call for periodic calibration. The simple rule is that adjustable equipments only seek calibration. A cube mould or a sieve can't or need not be adjusted and hence no calibration for them. An oven, a concrete cube or cylinder crushing machine etc. can be adjusted and hence need calibration for obvious reasons. Procedure for maintenance and calibration has been briefly discussed below:

A unique identification number may be permanently assigned to each item in a laboratory and the item should be labeled with the number. This will facilitate preparing a list of all items in the lab identified by their respective assigned numbers clearly mentioning whether calibration is required or not, the date of last calibration, if yes, the date of next calibration due etc. for easy reference.

Usually periodic calibration of such equipments are performed as recommended by their manufacturers or as suggested by quality assurance plan.

Calibration of all important items should be done by approved independent agency or third party. All valid calibration certificates are maintained as quality documents for future reference.

Third-party calibration of survey equipments are normally prescribed annually. However, internal calibration should be done at lesser intervals.

All items requiring calibration should have stickers/labels indicating up-to-date calibration status.

An up-to-date calibration register needs to be maintained showing calibration status of the items. It needs to show clearly details like frequency of calibration, external and internal calibration dates, next calibration due, relevant specifications or manufacturer's recommendation, calibration document details etc.

Non-adjustable items are physically inspected upon delivery as well as periodically. Quality documents on these items should be insisted from the manufacturer or supplier wherever required and maintained as quality records.

It is appropriate to maintain separate registers for surveying equipments and other items especially, electrical and mechanical (E & M) equipments. The formats of these register or the general process etc. are almost the same for all equipments.

Even though the schedules of calibration or checks for different categories of equipments are more or less the same, the type of calibration may vary from item to item. Also a single item may require calibration of several aspects of it. For example, a theodolite calls for calibration of its line of collimation, centering, vertical and horizontal angles etc. Hence, proper records showing results of all calibration or tests must be maintained mentioning all important details including rectification done, if any.

Quality records concerning maintenance and calibration of quality control laboratory Equipments include Manufacturer's quality documents, registers of survey, E & M equipments, schedule of calibration, calibration tags/labels, calibration certificates etc.

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