water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

TECHNICAL ADVISORY NOTE: CONSTRUCTION QUALITY ASSURANCE FOR WATER CONSERVATION AND POLLUTION CONTROL BARRIER SYSTEMS

1) Design and Construction Influences on Performance

The design of a facility will yield a predicted performance for the particular suite of design criteria; however, the design alone does not provide assurance of performance. This is due to construction phase influences during which unforeseen circumstances may arise resulting in changes to design detail of elements of a facility, or substandard materials supplied or substandard construction of components or combinations of the above. These possible construction effects should be considered during the design phase and addressed in a construction quality assurance plan so as to minimise the risk of reduced performance and maintain the design objectives. While it is known that the operational phase may further influence the performance of a barrier system, that aspect is to be addressed in the operation and maintenance plan and confirmed by monitoring over the short and long term. The construction phase impacts are however addressed by a suite of actions planned for ahead of construction and implemented so as to assure conformance and independence of the contractors self- implemented quality control.

2) The Difference between Quality Assurance and Quality Control

Both quality assurance and quality control in a construction project are aimed at ensuring the quality of the final product - the infrastructure. Even though they are critical parts of a construction project's quality management program, professionals often use the two terms interchangeably or listed together as QA/QC in public and private sector service documents.

However, Quality Assurance and Quality Control are distinctly different activities.

Understanding the difference between QA and QC helps clarify the communication between project owners, contractors and other stakeholders. A good understanding helps project owners and managers build the right team of internal and third party construction quality consultants to meet the project's quality goals. Conversely, a poor understanding can lead to decisions to forgo one or the other, increasing the risks of construction defects and other claims later in the project life.

Both QA and QC are valuable practices to help ensure quality. It pays to determine what exactly quality is. Quality is a measure of excellence in relation to customer/user requirements.

A quality product or service is free from defects and significant variations. It is the result of a process that adheres to measurable and verifiable standards that achieve uniformity of output. Ensuring quality is a strategic measure in construction against unwanted results, like claims or substandard performance.

Quality Assurance (QA) is a set of planned and systematic activities which are laid out before a building project starts. The aim of this activity plan is to give confidence that quality requirements will be fulfilled. It can simply be put as:

Quality Assurance is planning to do the right things, at the right time, the right way and for the right reason.

Quality Control are observation techniques and activities which aim to identify whether the final product actually fulfils customer requirements. Quality Control also identifies the need for corrective measures. In other, simpler, words:

Quality Control monitors work as it happens and ensures that the results satisfy the requirements specified.

To emphasise the difference between QA and QC, note -

Quality Assurance is about a *plan*. It is carried out *before* the construction project starts. Quality Assurance is a process that *manages* for quality. QA lists *the processes, standards and policies* that need to be carried out and ensures they are known to the people who need to know them.

The key elements of Quality Control are *observation* and *activity*. Even when you have the best plan and system in place (that's what Quality Assurance does), you still need to *monitor* the work as it occurs to make sure the *results* are what you expect them to be (Quality Control domain). Quality Control verifies the quality of the *output.*

Quality Assurance and Quality Control are different, but are complementary part of a larger concept – **Quality Management**. Achieving success in a building project requires both QA and QC. If either QA or QC are left out, an effective construction quality program can be crippled.

If you only lay out plans that define processes and procedures to be carried out (QA) but they aren't followed by anybody, it becomes little more than a paper making exercise. Those plans may be great; however, poor execution will lead to lots of rework, change orders, and mistakes slipping through, only to later become construction defects.

On the other hand, if your inspectors conduct testing and observations to check the quality (QC) without a plan, you can miss the whole purpose. The project can end up with inspection gaps or lack of follow-ups, mistakes can go undocumented and unaddressed and project programmes can be overrun. The project managers

wouldn't be able to see underlying greater problems that needed timely addressing – leading to failures to an efficient delivery of the product.

3) Contents of a CQA Plan

List of Tables

Appendix B: Standard specifications (SANS 1200; 1526; 10409; GRI for GCLs and GT cushion layers; ASTM D series for and GC3 and GN2 for geocomposites etc.)

Appendix C: List of Design Drawings as submitted to the Regulator

Appendix D: Example of performance parameter summary sheet

4) Contents of a CQC Report

There are numerous examples of construction quality control reports which reflect the contractor's confirmatory tests to validate payment certificates and the engineer's assessment of production and compliance with design specifications. These may vary depending on the nature of the works and materials ranging from earthworks and geosynthetics, to concrete and steel-works. Guidance may be obtained from the ICOLD Bulletin 56 of 1986, Quality Control for Fill Dams. The implementation of SANS 1200 standard specifications will further inform a CQC report on the number and range of tests. A matrix to assist with reporting is included in Appendix D of the attached example CQA plan.

5) Example CQA Document

See the appended document.

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