GEO-X (PTY) LTD WHITE PAPER ON THE CONTINUOUS IMPROVEMENT OF GEOSYNTHETICS INSTALLATIONS

A. H.Weidlich
Geo-x (PTY) Ltd

Your Institute, Country (funkown@institute.org), Your Institute, Country (gunkown@institute.org)

ABSTRACT:
Over the last two decades there has been significant technological advancements with regards to geosynthetic materials and the equipment utilized for the installation thereof. However, during the same period Geosynthetic construction quality control and quality assurance procedures have remained largely unchanged. At the same time, driven by greater environmental awareness and responsibility, a large contingent of regulatory agencies from around the world require more complex barrier systems to achieve compliance with local and international containment standards and specifications. These complex multiple composite barrier systems in some cases comprise of up to seven layers of Geosynthetic materials which need to be installed on top of one another. The ultimate goal being, that these separately installed layers, function as a single system, which performs its sealing function as intended during the design engineering of the project.

It stands to reason that as barrier system complexity increases, so too should the practical implementation and management of the onsite construction quality control and quality assurance. It is not sufficient to simply apply standard or generic onsite construction quality control and quality assurance procedures, which generally comprises of the written completion of hard copy documentation to be submitted after the completion of an installation project. This approach lends itself towards administrative errors and/or practical installation mistakes which could ultimately lead to barrier system failure.

This paper presents insight and hard data on how technological advancement and the availability of cloud based computing, has enabled the successful development and implementation of a construction quality control and quality assurance system. The Geo-Q cloud based system provides live access to all stakeholders of a project, ensuring the delivery and availability of all required project construction quality control and quality assurance information and documentation, 24/7. This paper will further demonstrate how live access to the system contributes to the successful technical and commercial completion of Geosynthetic installation projects.

Keywords: Installation, CQA, CQC, Geosynthetic Materials

INTRODUCTION:

- Geosynthetic materials and installation equipment has evolved tremendously over the past 20 years. Yet construction quality assurance procedures have remained largely unchanged.
- The fact that some countries around the world have various sealing application layers which are specified by regulatory authorities or even in some instance have been promulgated in to law have certainly changed the way that construction quality assurance should be conducted on construction sites.
- Applying rigorous construction quality assurance procedures which are linked to approved standard documentation is not enough.

The question is where do we go from here?

- This paper will reveal how the above is not completely adequate in today's day and age. It will further provide insight on how we can link specific processes to on site procedures, ensuring that the standards which have been developed for the installation of all Geosynthetic materials are met on a daily basis during on site operations.

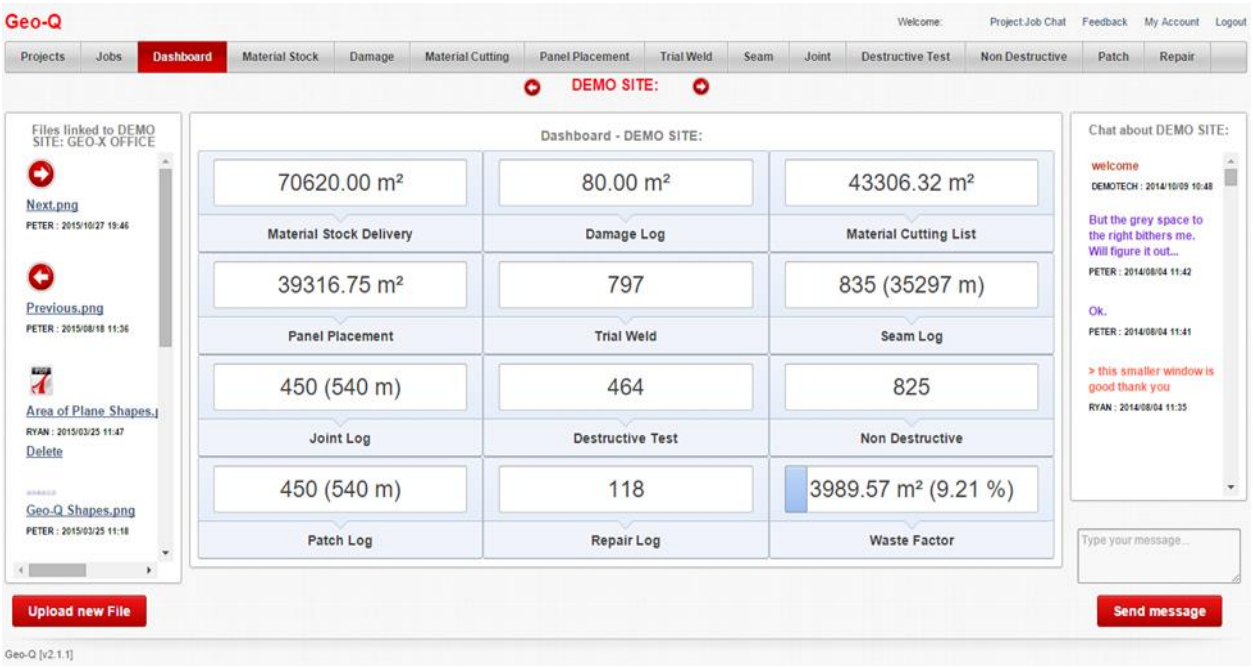
BACKGROUND:

- Having over 15 years' experience in Geosynthetic installation operations, it has become clear that steps need to be taken to improve or compliment the Geosynthetic installation Standards that have been developed in South Africa.
- Currently project completion, construction quality assurance and construction quality control (CQA/CQC) data packs consist of manually completed Excel spreadsheets, data capturing software or hand written documentation.
- Although all documentation is based on the given standard imposed on the project there are still multiple errors (garbage in garbage out).
- The growing demand for Electric leak location surveys worldwide and improvement on the rapid development of the equipment will most likely become the norm in most countries in the near future and can be used as an indication of how competent the Geosynthetic installer is by evaluating the number of defects on a specific site, depending on the application.

SOLUTION:

- Geo-x funded the development of a CQA/CQC system that would be able to function on an online and/or offline platform and enforce the applicable standard specified on the project. Information recorded is available in real-time through a cloud based platform where the Client, Engineer and all other stakeholders on the project have on demand access.
- It is now possible to view what happens on site in the boardroom, which makes online collaboration with the Client, Main Contractor, Geosystemic Installation Contractor, Engineer and even the Manufacturer of the materials possible.
- Geo-X have tested the application over the past 2 years and have completed numerous projects successfully, setting a new benchmark for compliance in Africa.

Example of Dashboard:



2.2 COLLABORATION:

- Through Geo-Q Manufactures have access to ensure that the materials supplied are correctly installed and fit for design requirements. The Manufacturers have access to data that was previously not available and can now be used for research and development purposes, for example, (weldability of materials under different environmental conditions).
- The Client or Client Representative has access to the Geo-Q platform in order to participate and obtain accurate information at any given time, enabling verification that all information recorded is correct.
- The Main Contractor, who is ultimately responsible for the completion of the project, has access to verify that all information recorded is correct.
- The Engineer or Resident Engineer has access in order to verify that all that has been completed for the day does comply with the project specification.
- The Geosynthetic Installer or Third Party Quality Controller has access to populate the information supplied to the crew on site and to complete the verification process after all testing procedures have been completed for the day.

2.3 OTHER BENEFITS:

- The data pack is available immediately upon completion, no editing is required, just simply download the entire pack.
- Access from anywhere on a tablet, laptop or desktop.
- Check list and hold points can be changed to suite project specific requirements.
- 12 Hold points daily.
- 86 check points as per SANS 10409.
- Daily check lists.
- Daily Sign-Offs.
- It offers 24hr world wide access to cloud based QAQC data for your specific project.
- Allows for uploading of photos, documents and videos recordings to the Geo-Q platform for reference points.
- Live online chats, specific to the project, are now downloadable as Minutes of Meeting for each project.
- It maintains complete tractability of all lining materials used for the project from manufacturing to installation.
- There is no need to download software to a device.

3. CHALLENGES:

It goes without saying that the most difficult part of implementing such a transparent CQA system is getting the industry (particularly other applicators) to accept and participate in the initiative. As a result, Clients and Engineers have been approached to assist with the implementation of the CQA System.

From an operational perspective a significant amount of time and effort has had to be spent on training each and every individual who will ultimately operate on any Geosynthetic installation site, in order to change the manner they apply the process in the field.

Training not only consists of basic equipment use, but consists in detail about materials being installed on site, technical characteristics and behavior of different geosystemic materials. Once this was understood we needed to teach each and every person about Project Management and how to implement procedures to complement each process.

4. CONCLUSION:

A great deal has been learnt by going through all of the above and subsequently Geo-X was able to produce an Installation Manual and Guideline that would complement the standard set by various Engineers and Authorities. Through continued collaboration with all stakeholders on an equal platform we can all contribute to the continuous improvement on the installation of all Geosynthetic materials.