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Exploiting SharePoint Capabilities to Improve Document Control as per ISO 9001:2015 and Incident Reporting for Effective Business Intelligence

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Abstract

Regulated companies that are able to effectively control and retrieve the information they need, such as SOPs, work instructions, engineering change orders and the like, during critical audits and inspections, can more easily avoid the manufacturing mistakes that ultimately lead to fines, penalties, and costly production delays. For this reason, quality document control continues to be the most critical quality assurance discipline, and the most important aspect of any quality management system (QMS). Through the utilization and exploration of SharePoint capabilities, a TCF database system was developed to enable incident reporting, product management and document control.

Keywords
Quality Control, Quality Management, ISO 9001:2015, SharePoint

1. Introduction

Industrial engineers have played a key role in the development and implementation of Quality Management Systems which is a structured framework and set of processes designed to manage and improve the quality of products, services, and processes within an organization. With the ISO9001 Quality management Systems standard being the most widely used and internationally recognized. More and more organisations such as AECI Mining Explosives are moving away from Legacy systems. Often times it is a difficult job to motivate management to migrate away from these systems due to various reasons, such as cost constraints, perceived stability, reluctance to change, or the complexities associated with transitioning to newer technologies.

During the manufacturing process, all regulated organizations must adhere to quality document control best practices. This is dictated by stringent ISO standards. Because documentation drives almost every action in a company, the ability to control it can mean the difference between an organization's survival and extinction in the competitive life sciences and manufacturing industries. Document control, as per ISO (International Organization for Standardization) standards, refers to the systematic management of documents and records throughout their lifecycle to ensure their accuracy, availability, integrity, and traceability.

In this context, the current research emerges as a compelling area of investigation. With the advent of digital solutions, industrial engineers are presented with unprecedented opportunities to enhance operational efficiency, streamline quality management, and harness valuable insights from data. By extending this exploration to the realm of business intelligence, the research envisions a holistic approach that not only improves core processes but also empowers decision-makers with well-informed, data-backed choices. As industries continue their pursuit of operational

excellence, this study seeks to contribute valuable insights into how the convergence of technology, quality management, and business intelligence can shape the future of industrial engineering practices.

1.1 Objectives

The objectives of this study include:

- To evaluate and determine the current document control state with process maps.
- To investigate and discuss the feasibility of SharePoint as an Electronic Data Management System.
- To conduct a root cause analysis on the current state and determine requirements and specifications for management system.
- To develop a database system for Document Management System with TCF parameters and requirements

2. Literature Review

The literature review herein embarks on an exploration of the relationship between industrial engineering practices, ISO 9001:2015 Document control standards, information quality, incident-reporting methodologies, and the dynamic capabilities of SharePoint collaborative platform. Through scrutinizing studies, frameworks, and case examples, this review seeks to understand the patterns, successes, challenges, and gaps in the application of SharePoint to enhance these critical operational facets through studies previously done. Furthermore, the review will extend its scope into the realm of business intelligence and task automation —an emerging sphere within information management —where the coalescence of streamlined document control and incident reporting has the potential to furnish invaluable insights for strategic decision-makers.

2.1 Quality Management Systems

The ISO 9001 standard aims to establish a consistent and standardized approach for how businesses and organizations interact, register, and achieve ISO certification. This certification, regardless of the organization's size, provides global assurance to customers that they can consistently meet customer demands. Ensuring the effectiveness of the Quality Management System (QMS) is crucial for ISO-certified organizations, as it needs to be continually improved and its performance measured (Smith et al. 2014).

According to the American Society for Quality (2023) ISO 9000 encompasses a set of standards and recommendations related to Quality Management Systems (QMS) and their implementation. The primary goals of implementing a QMS are to enhance customer satisfaction by meeting their needs, achieve ongoing improvements in organizational performance. A strong quality management system is based on strong document control, which is critical element of the ISO standard. It is critical that all instructional documents and records are managed to ensure that only the latest information is used to make decisions and all records are kept to ensure traceability. As highlighted above, document control is a key part in the Quality Management System of any organization as set out by IS09001 to ensure quality of the final product or service. According to Bryne (2023) the ISO9001:2015 standard necessitates the implementation of procedures for managing document access and modifications, aimed at safeguarding the accuracy of the data utilized in the creation of products that fulfil customer anticipations.

According to Crane (2010) being ISO certificated and having implemented an acceptable QMS does not come with built-in assurance that the system and process are efficient, productive and outstand those of their competitors. For that reason, it is then essential that organisations are continuously improving their document management practices and ensuring that they have adequate resources to enable the improvement.

Design for Six Sigma (DFSS) is a method used by organizations and teams to innovate or invent products, services and processes, Deshpande (2016) states that there are two approaches for implementing Six Sigma which are Define-Measure-Analyse-Improve-Control (DMAIC) and Define-Measure-Analyse-Design-Verify (DMADV). In this project the focus will be on the DMADV methodology, as it is customer oriented and focuses on the needs of the as they relate to a service or a product (Deshpande 2016). According to (Goetsch et al. 2014) DMADV improves product performance, aimed at designing robust and reliable product with lesser maintenance cost, lesser spare changing frequency and improves customer satisfaction, improves business profitability and increases market share of the business.

2.2 Root cause analysis

Root cause analysis (RCA) is a process created to examine and sort out the fundamental reasons behind incidents that have effects on safety, health, the environment, quality, reliability and production (Goetsch et al. 2014). As technique RCA is useful, as it can be used to identify an event, an event being an occurrence that can result in or has the potential to result in consequences, not only does it address "why it happened" but it also addresses "how and why it happened" and reduce the likelihood of it happening again (Goetsch et al. 2014).

SharePoint can be defined as a web-enabled application that is installed on Microsoft Windows servers and that can be accessed from different machines in the network through a web browser (Kendall et al. 2014). On the website, one can store different information, such as documents, emails and spreadsheets. It enables an individual to store business information including tasks, projects, calendars and more. It therefore acts as a central repository to store all business information (Kendall et al. 2014). SharePoint is an automated platform and technology system that has the ability to facilitate knowledge sharing, collaboration and content management (Khumalo et al. 2019). SharePoint has unique workflow features that are out-of-the-box such as approval workflow and records routing; this workflow application installed in SharePoint enables the effective workflow within an organization (Lozier 2017).

3. Methods

In order to carry out research effectively, it is crucial to possess a clear plan outlining the direction and approach the research should take. To establish an impartial structure for the research, Saunders Research Onion, has been utilized as the framework that will define the research methodology for this project. The authors selected a pragmatism research philosophy as this research aims to improve practice through the application of concepts. An inductive approach was used where a qualitative approach was used. The authors selected the pragmatism world view and followed an abduction approach as both deductive and inductive reason would be required in the research. The author selected mono-qualitative data approach. The research was conducted on a cross-sectional timeline, by making use of interviews, archival research and case study methods to conduct the research. The data collected was collated and analysed with qualitative methods.

4. Results and Discussion

AECI Mining Explosives has a company standard (CSQMS/0023) which is a document and record control standard defines the hierarchy, preparation, authorization and control of instructional documents and records, as well as the requirements to ensure the integrity of the data system to ensure that requirements as required by ISO 9001:2015, ISO 14001:2015 and OSHAS 18001 are met. A hierarchy of documents is established based on the level of control they require, with high level documents such as policies at the top and lower level documents such as record sheets at the bottom of the hierarchy as shown in the figure below.

A process map of the local document process is the current procedure as per standard, but this is not the actual procedure that is being utilized as the current SharePoint system does not have workflow capabilities, resulting in a deviation and non-compliance to the approved document company standard. Discrepancies can be noted between the two process maps local document control process map (SharePoint) as per current CSQM standard & current manual local document control process (Deviation from standard). The current state of document control at AECI heavily relies on emails and manual systems when the SharePoint platform that can be used for collaboration is in place. In using manual systems there is a lack of transparency and archives cannot be easily retrieved.

4.1 Measure (M) and Analyse (A) phase

The objective of this chapter is to evaluate and determine the current document control state with process maps. Through the service requests to the IT helpdesk, where these service requests primarily consisted of qualitative content, often presented as free-form text descriptions of the problems to be addressed. Typically, each request encompassed multiple issues, and some issues were expressed in a vague or ambiguous manner. The common problems are highlighted below from which were gathered from the 2021 and 2022 quality management review. The objective of the review is to determine, based on the objective evidence, the continued suitability and effectiveness of the quality management system in achieving quality objectives as stated in the AECI Mining quality policy. The purpose of management reviews is to review the quality performance of the previous year and identify areas of improvement to facilitate continuous improvement.

The team followed the 5 Why's approach and it was determined that:

a. Why is there improper document control after migrating from the legacy system and not using SharePoint?

Because there was no clear plan for document management during the transition.

b. Why was there no clear plan for document management during the transition?

Because the focus was primarily on data migration, and document management was not adequately considered.

c. Why document management was not adequately considered during the migration process?

Because there was a lack of awareness about how SharePoint could address document control needs during and after the migration.

d. Why was there a lack of awareness about SharePoint's capabilities for document control?

Because there was insufficient training and communication about the potential benefits of using SharePoint for document management during migration.

e. Why was there insufficient training and communication about SharePoint's benefits?

Because there was an assumption that employees were already familiar with SharePoint, leading to a missed opportunity to educate.

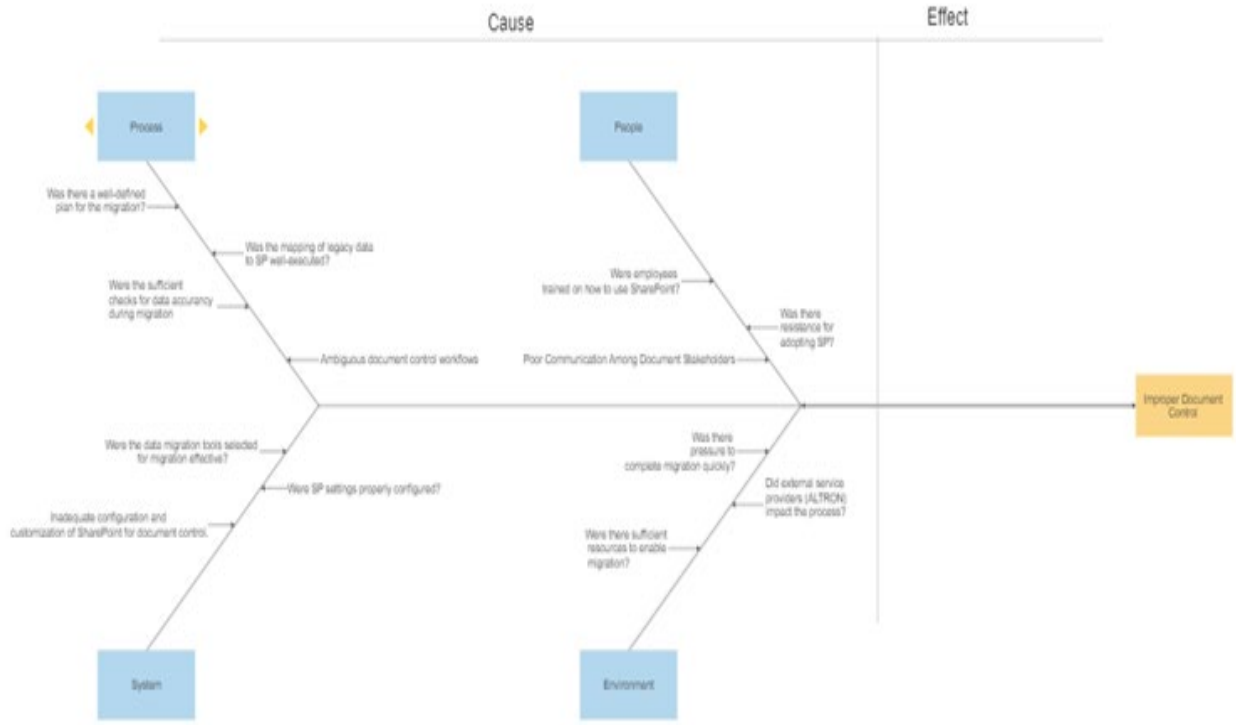

Figure 1. Root cause analysis for Improper Document control

The discussion of root cause analysis categories concludes that in almost every category the problem identified leads to the lack of formal EDMS with track and traceability during this migration period as shown in Fig. 1. For future expansion on the problems identified, a link can be created between the document control and enablement of incident reporting. This can be done when the reporting system is working efficiently and effectively. Another future expansion of this project is to create a TCF system that will group documents according to their product.

After consulting with team members and the data from the root cause analysis, the following requirements were identified, and business initiation document was drafted with requirements. The business problem being Edge (Legacy System) was the platform used for all quality assurance systems like CAPA, complaints, concessions and deviations, bonding and document control. There current availability of these systems is critical in managing the quality system

and audit trail for maintenance of the ISO 9000 certification. In addition, the requirements in the form below should also be taken into consideration:

- The design must user friendly.
- The system should be easily accessible.
- The system should identify different role players.
- The system should be able to report and track hazards/incidents.
- The systems should be able to give feedback to the relevant role players.
- The system should allow for future expansion on trend analysis using BI.

A Technology Control Form (TCF) is a document or process used by organizations, typically those dealing with sensitive or controlled technology, to manage and control access to certain documents, data, or technologies. The purpose of a TCF is to ensure that only authorized individuals or entities can access, use, or distribute specific information or technology, often for reasons related to security, compliance, or intellectual property protection.

4.2 Design (D) and Verify(V) phase

The next step is to develop a TCF database on SharePoint that will enable the documents to be easily retrieved. A technical construction file number range was assigned to all products in the product catalogue. Allocation of these numbers also ensures that all documentation for new product introduction (NPI), packaging, TCF and KPMG reflect the same number. Each range will run from 1001 to 9999 and therefore will provide ample numbering for the years to come.

AECI MINING EXPLOSIVES	Company / Factory / Center / Area AECI MINING EXPLOSIVES	Document Reference R/126/03	Revision 05
	Document Type RAW MATERIAL SPECIFICATION		TCF Number -
	Title Calcium Nitrate (For emulsion production)		Page 5 of 8

Figure 2. AECI document Header with TCF

Although SharePoint already has a built-in MS Access web app (database), it is essential to understand database theory as the TCF process makes use of a primary key, which is TFC (Fig. 2) in this case, and other attributes. The implementation of this system does not alter the document control procedure but rather the EDMS to allow easy retrieval and tracking of documentation.

A TCF database platform was designed as shown in Figure 3 below, how it works is when prompted for a TCF number it brings up all the documents related to the product grouped as shown in Fig. 4, multiple use case scenarios were used for verification purposes.

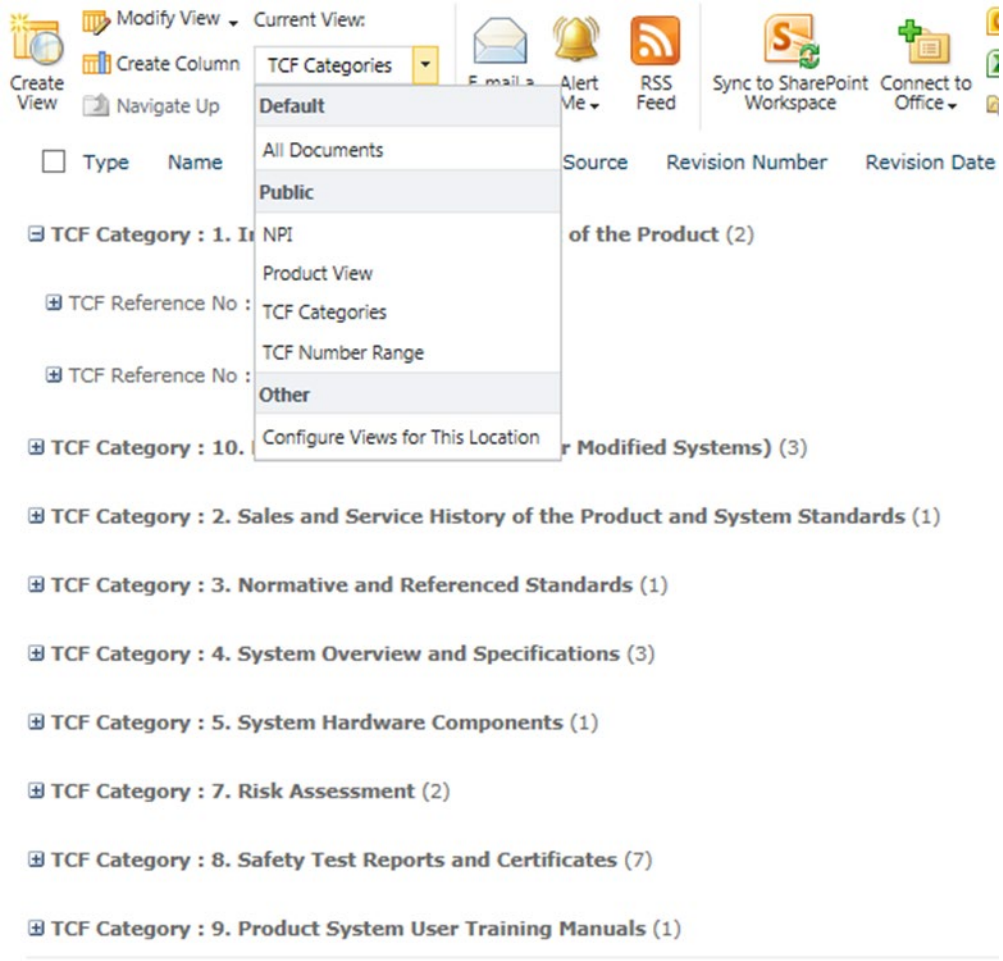

Figure 3. TCF database platform

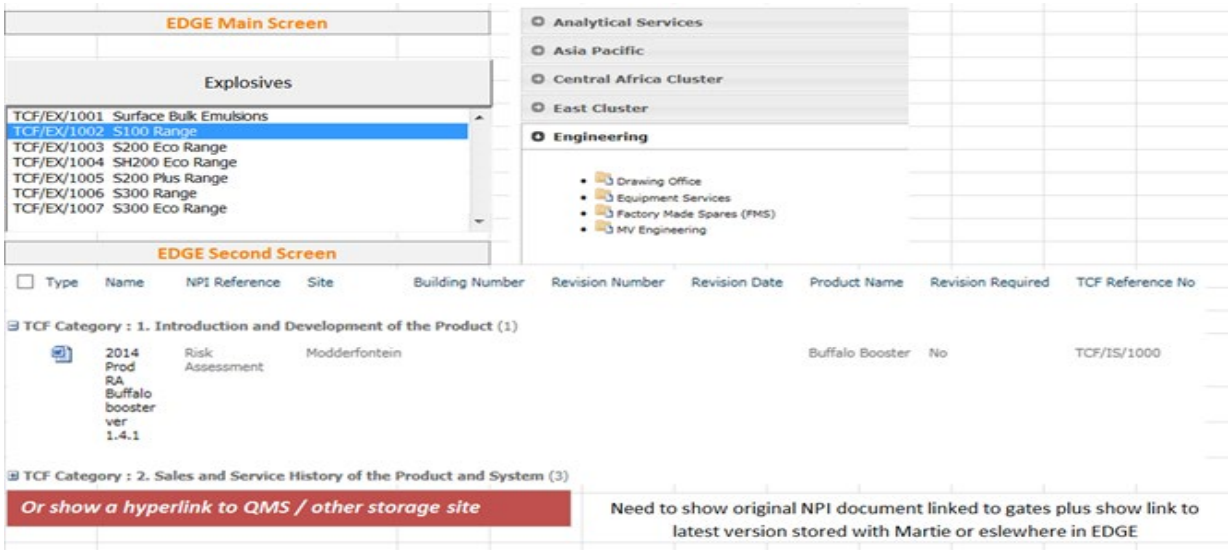

Figure 4. Product group information

6. Conclusion

In this study, we looked at how to use SharePoint's features to improve document control in accordance with ISO 9001:2015 standards and to maximize incident reporting for useful business insight. The study produced the following significant conclusions and insights:

SharePoint strengthens document management; it offers a reliable platform for handling documents in accordance with ISO 9001:2015 specifications. Organizations can set up efficient document control procedures because to its features for version control, metadata tagging, and access rights. With the TFC approach, documents can be easily retrieved for auditing purposes, incident management and for report referencing.

Due to SharePoint's adaptability, it allows for streamlined Incident reporting, through which businesses can design unique incident reporting forms and workflows that simplify the gathering, monitoring, and analysis of crucial event data. This helps with pattern recognition and trend analysis for better business insight.

SharePoint also offers possibilities for Integration, there are ways to improve the overall efficiency of the incident reporting and document control procedures by integrating SharePoint with other business systems and technologies such as power BI. Manual systems, such as email back & forth as currently utilized by AECI, tend to get disorganized, and clearing up the disarray can take a lot of effort. The system created for this project reduces the amount of time needed to manage the processes and procedures by automating certain of them. This comment supports the idea that digital systems foster a culture in which users spend less time on tiresome tasks and organizing disorders. The DMADV approach was also practical, customer oriented and focuses on the needs of the as they relate to a service or a product.

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