

Knowledge Management for Process Diagnostics and Improvement

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1.0 Introduction

This paper describes the benefits and features of knowledge management for process diagnostics and improvement. Large corporations are in search of better ways to diagnose and improve manufacturing processes. They are examining techniques to manage their knowledge and share it with others in the organization in order to make better decision in process diagnostics. Currently, they create and maintain knowledge in isolated systems targeted at specific workgroups. Therefore, for users outside of the workgroup, that knowledge is virtually invisible and unreachable. They often spend time looking for it, recreate it, or do their job without it. In a global environment with significant outsourcing of parts manufacturing this leads to inefficiencies. The use of computers, coupled with the connectivity of computer systems makes computer based knowledge management a feasible solution to organize information. This addresses the broad process of locating, organizing, transferring, and more efficiently using the information and expertise within a company. With the help of Internet, knowledge management has the potential to provide engineers a tool for process diagnosis and improvement. This paper describes a prototype system for managing surface texture information for process and function related diagnostics.

2.0 Features

Definition of knowledge Management is the conceptualizing of an organization as an integrated knowledge system, and the management of the organization for effective use of that knowledge [1]. The knowledge management system offers a unique way to manage information and share it with everyone in an organization. This provides people better ways to diagnose and improve manufacturing process. This system is accessible through a web browser with an Internet connection.

The knowledge management system is designed using Microsoft Site Server and Microsoft SQL Server. These tools work in conjunction with existing Microsoft Internet Information Server and NT technologies, such as Active Server Page. Microsoft Site Server is a powerful intranet server, optimized for Microsoft Windows NT Server with Internet Information Server, for publishing and finding information easier and faster [2]. It can help organizations streamline the information-sharing process by providing content authors with a structured submission, posting, and approval process. Users can easily find and use information for process diagnostics and improvement.

2.1 Content Management

The system provides the user better ways to management content and deploy it to others. It allows a content provider to submit, tag, and edit content using Web Interface. Site editor can then approve, edit, and enforce uniform guideline for content [2]. After a site editor approves a submitted content, this content is deployed to destination Web servers securely and is grouped and indexed into catalog used for searching.

Figure 1 shows how the content provider submits a roughness parameter paper. The user drags a file in a folder and then attaches attributes related to surface parameter, such as parameter type, title and abstract. This content is then transferred to a content editor for approving before adding to catalog used in the search engine or published as shown in figure 2.

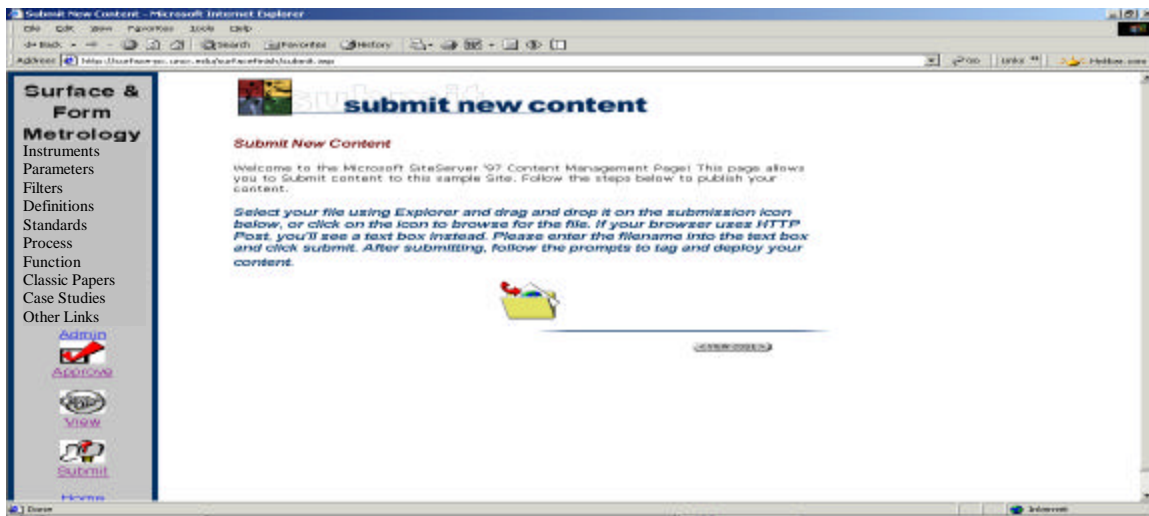


Figure 1. Roughness parameter is submitted to a content editor

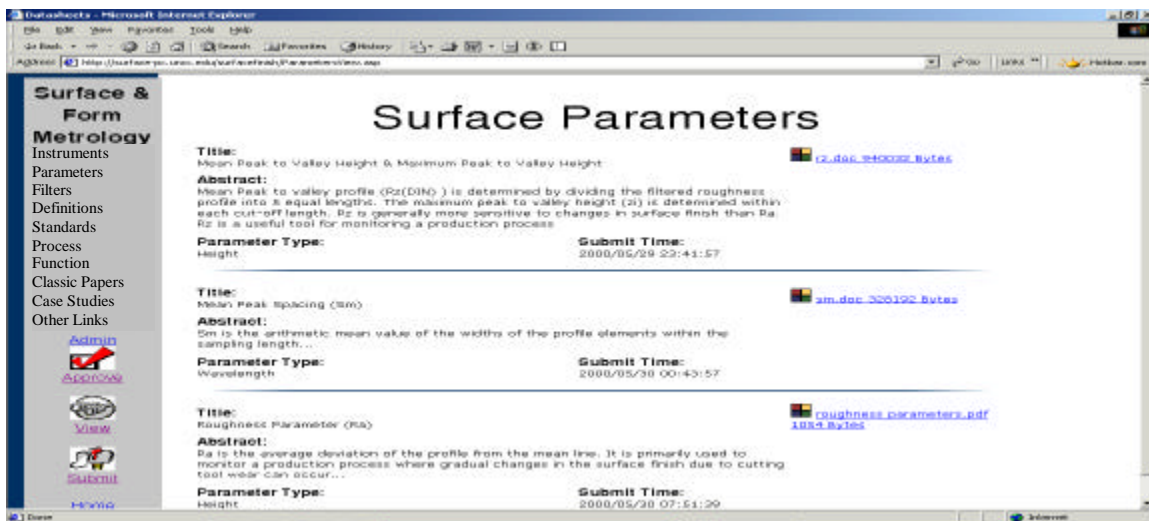


Figure 2. Information of surface parameter after it is approved

2.2 Knowledge Manager

Knowledge Manager provided in the system uses the rich information created by content management or the existing service making it useful to other. Users can easily browse, search, share, and subscribe to relevant information with a centralized Web-based application. Knowledge Manager is considered as information portals, which are shown in figure 3 [2]. Instead of looking for information based on a general search, the user can move toward categorized and personalized information. People in an organization can decide what information is available through the portal and can obtain information passively or actively. With tagged content, the user can quickly search information based on specific category, such as parameters, case studies, and instruments. The information can be periodically scanned and sent to the user based on their interests. The user can have information emailed or pushed to them instead of going to the portal.

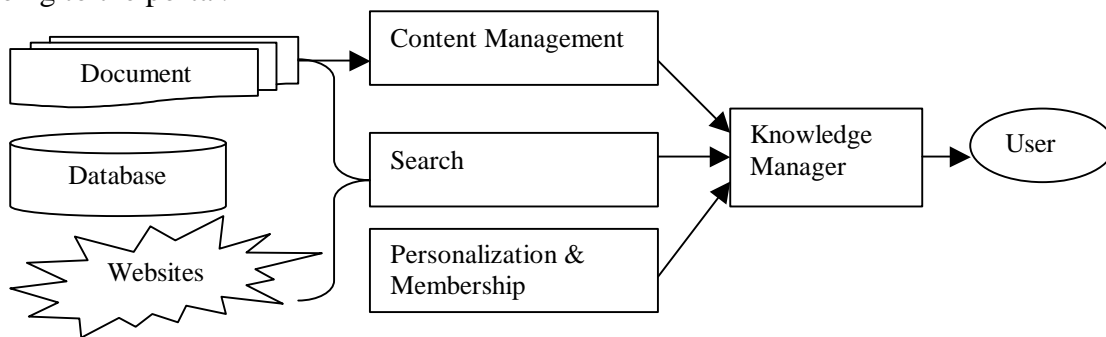


Figure 3. Information portals used in knowledge manager [2]

Figure 4 shows a search center provided in the Knowledge Manager. The keyword “roughness” is searched in Parameters category; the result gives the user Mean Peak to Valley height including its abstract, and URL that links to the paper of this parameter.

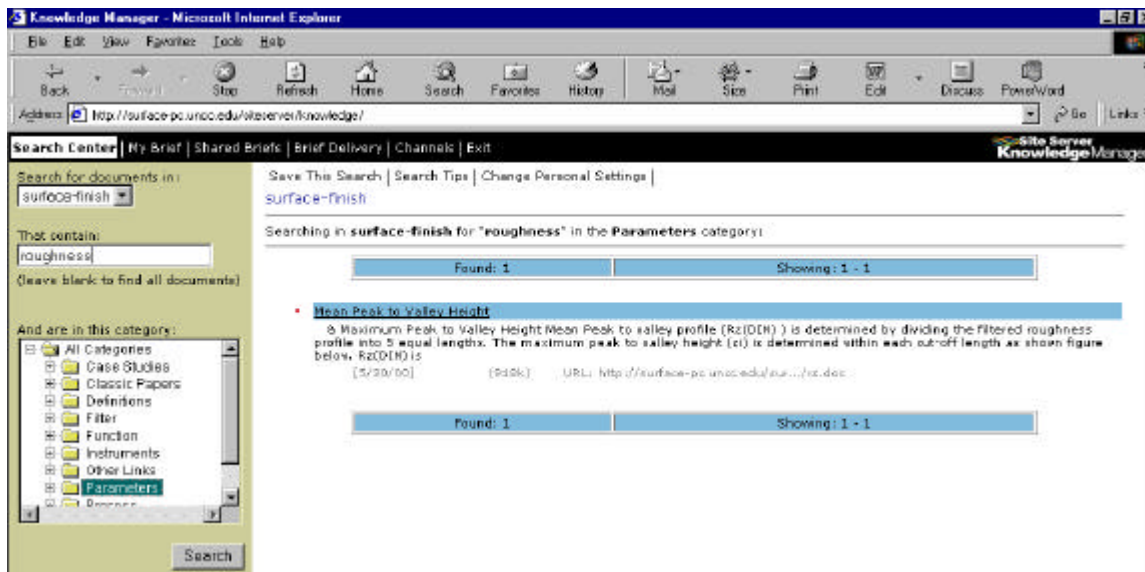


Figure 4. Search center in knowledge manager

2.3 Personalization

Personalization provided in the system makes a complex site easy to use by providing solutions that use strategies to address individual needs and promote individual success [3]. Engineers can customize for example a “My Metrology” page by retrieving information based on their interests from information portal, such as standards, filters, or some information related to surface and form metrology. This gives engineers more knowledge on specific manufacturing process that they want to learn. This helps them to diagnose problems in a process quickly.

3. Conclusion

The current prototype system covers surface metrology and it will be expanded to include form, process, and function related information. Knowledge management tools offer a more efficient way to manage information and deploy it to others in an organization. It is very helpful in process diagnostics and improvement. The benefits of this system are:

- ?? Awareness: everyone in a company knows where to look for knowledge to diagnose and improve a manufacturing process. This saves engineers time and effort.
- ?? Accessibility: all individuals can use the combined knowledge and experience in the context of their own roles
- ?? Availability: with the help of Internet, knowledge can be used wherever it is need and whether from a plant, office, home, on the road, or at the vendor’s site.

4. Preferences

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