



DOCUMENT MANAGEMENT SYSTEMS IN ENGINEERING AND CONSTRUCTION INDUSTRIES

....15% of all paper handled in businesses is lost, and 30 percent of all employees' time is spent trying to find lost documents<sup>1</sup>...

...for every dollar that a company spends for a final document, ten dollars are spent to manage the process<sup>2</sup>...

... IT workers take, on average, 15 minutes to return to serious mental tasks, such as writing reports or computer codes, after dealing with incoming email. They wandered off to reply to other messages or browse the Web<sup>3</sup>...

Statement alike the above are manifold. They clearly indicate the importance of the process of handling documents in such a way that information can be created, shared, organized, stored efficiently and appropriately.

Today's electronic systems that are designed to organize and manage documents are often related to as Document Management Systems (DMS). These systems allow the management, distribution and centralized storage of all the project documentation between all the project stakeholders.

WHY TO USE A DOCUMENT MANAGEMENT SYSTEM

There are many compelling reasons to use document management software versus storing files on local hard drives and/or networks, or even on applications as Dropbox. Such reasons include: secure access, centralized storage, no duplicates, file search using filters, revisions control, automatic notifications, document workflow control, no need of software installation, unlimited storage capacity, automatic back up, multiple permits, among others. An illustrative overview is given in fig. 1.

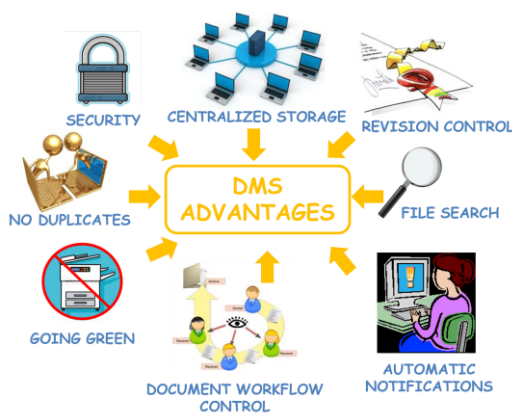


Fig. 1. Illustrative overview of some of the key advantages when using an electronic data management system.

<sup>1</sup> Jane M. Von Bergen (Knight Ridder Newspapers), The Boston Globe, 3/21/2006  
<sup>2</sup> From: "Designing a Document Strategy" by Kevin Crain  
<sup>3</sup> New York Times, 3/25/2007



Fig. 2. EC's Document Management System access page – Projects Online

One of the primary advantages of a DMS is the centralized data storage. Having data stored on the user's local systems creates silos of duplicated data which cannot be easily accessed by other project participants. Other very important features of a DMS include automated processes for document workflow and revision control, which enable organizations to follow-up the entire history of individual documents throughout its different production stages. Furthermore, document access and distribution can be handled automatically and according to established rules of entitlement, thus improving security and avoiding individual collaborators from being distracted by floods of "useless" information.

The latter specially apply for multidisciplinary and/or large engineering projects, where the number of the design and construction documents to be produced for one single project often is in the order of thousands. Each of the individual documents (may it be an e.g. design criteria, technical specifications, drawings, calculation report or bill of materials) is a living document that is to be produced strictly according to a defined process and in compliance with project timelines and quality standards and will have several versions until its final stage (construction or as built) is reached. Also, a centralized DMS is extremely useful in projects where design and construction documents are produced by different design teams, with different engineering packages and acting at distinct geographical regions, providing the management or customer team the possibility of a centralized follow up during all the project phases up to its completion. In Fig. 2, EC's Projects Online access page is depicted, being Projects Online an EC's own development based on the need of a communication system that includes all the key advantages already described.

DMS IN PRACTICE

A key aspect for the successful implementation of DMS tools is the management of its constant update. Systems with outdated information are generally useless, if not killers.

In view of this one needs to implement a well-defined DMS update process, which defines periodicity, ownerships and responsibilities for the update of each type of information. Another important point is that the information structure of a DMS is easily understandable. For the case of project-related DMS applications, it is good practice organize the information according to the project deliveries structure. An illustrative example of such information classification, for the typical case of an EPC (Engineering, Procurement and Construction) project, is depicted in schematically in fig. 3. This scheme proved to be very useful in “fast-track” projects, where engineering and construction activities occurred simultaneously and the different access levels enabled the visualization of documents according to the group’s corresponding activities (e.g.: clients, project management team, subcontractors, etc.).

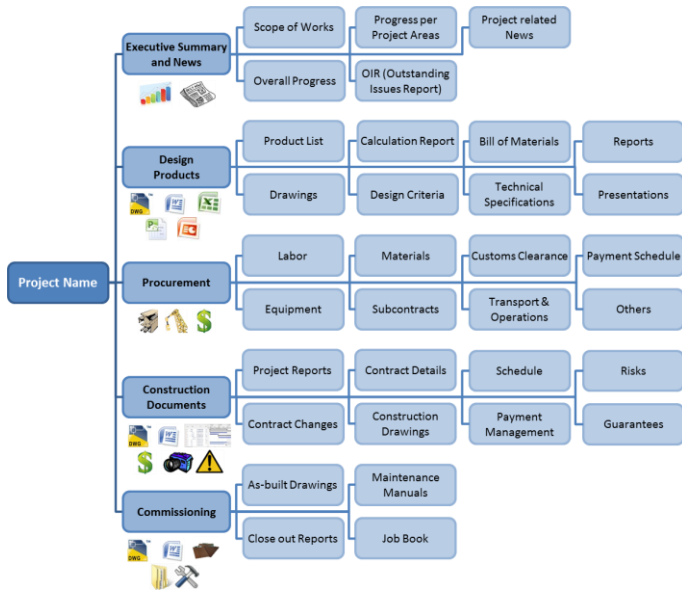


Fig. 3. Illustrative example of organizing the information of an EPC project according to the different project stages into relevant deliverables classification.

**DOCUMENT MANAGEMENT SYSTEM AT EC (EC’s PROJECTS ONLINE)**  
The implementation of first documentation management systems at EC dates back to the early 2000’s, at initial stages of the emergence of webpage-based project communication technology. In Fig. 4 a schematic overview of online information at EC’s website is depicted.

In view of better serving its international customers for the design of large scale industrial projects, with different project stakeholders often located thousands of kilometers apart, EC developed its own concept of communicating project-related information through a dedicated website, which was periodically updated and was easily customized according to each project needs. Such concept, named “PROJECTS ONLINE” was then unprecedented in the region for the online follow up of engineering projects. Such concept enabled EC’s customer to monitor their projects via web, accessing an executive summary on the general project status, as well as individual drawings, reports and documents.

A web-based management system constituted an enormous advantage over the traditional information flow in engineering projects, which restricted information access only to official documents which have been readily filtered and approved by project

management. EC clients could now be in touch with their project on a “real time” basis, with the added benefit of active and timely participation. As a result, needs for changes could be detected at early project stages, thus substantially reducing overall design and construction costs.

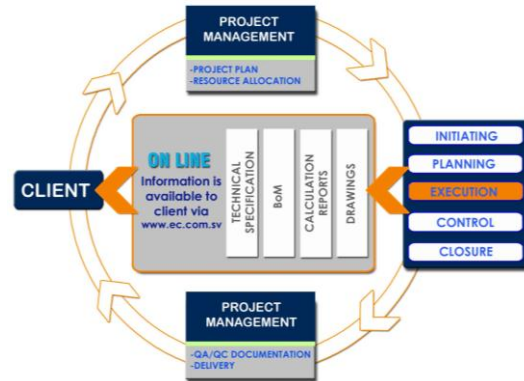


Fig. 4. Information flow scheme of EC’s web based project communication tool from EC (PROJECTS ONLINE), which enables the client to access document information on-line, as it is being produced.

**EC SERVICES: MULTIDISCIPLINARY PROJECT MANAGEMENT SUPPORT – COMMUNICATION TOOL ([www.projects-online.net](http://www.projects-online.net))**

EC PROJECTS ONLINE Document Management System plays a key role for controlling the flow of different information contents exchanged between project stakeholders. Key features of this system summarize as follows:

- ✓ Customizable interphase according to each customer needs
- ✓ Centralized data storage with permanent access via internet.
- ✓ Customizable windows-like folder structure
- ✓ Customizable information access levels
- ✓ Programmable document flow control, according to project-specific processes (e.g. elaboration and approval stages)
- ✓ Upload wizard supporting both single files, or groups of files
- ✓ Advanced information filtering techniques
- ✓ Information organization through use of smart tags
- ✓ Email alerts on document changes and uploads

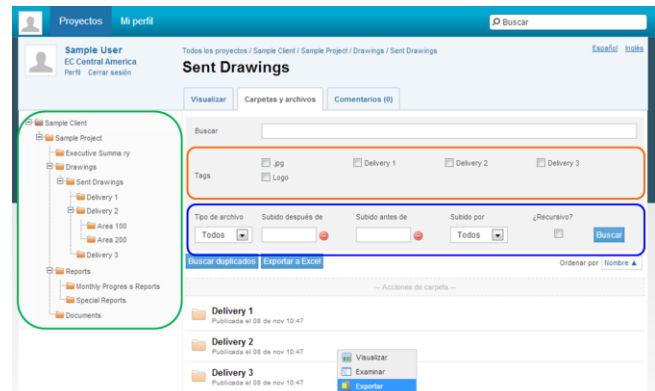


Fig. 5. Preview of EC Projects Online web-based interphase including its main components: customizable folder structure (green), filters (orange) and search options (blue)

Projects Online is an EC’s internal standard feature in all of areas of services: Consulting, Multidisciplinary Detail Engineering and Project Management Support for Building Systems, Industrial Plants and Infrastructure Projects.