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Practical Application Challenges for Construction Submittals in a Paperless Contract File

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Abstract

This research study explored the transition from a paper to paperless environment for the U.S. Army Corps of Engineers construction submittal process. For several years, the Corps has intended to implement a new multifaceted version of Common Access Card (CAC) enabled Resident Management System (RMS) to include submittal management. The purpose of this study was to provide guidance to make an effective transition from existing paper review process to a paperless digital paradigm, while securely and effectively incorporating multiple requirements and constraints with multiple users. More specifically, how to process digital submittals uniformly and effectively within RMS provided the viability of RMS version 3.0. The implementation of RMS 3.0 would standardize the electronic submittal process, but has had several years of delay. Current policy for electronic submittals is at the discretion of the Contracting Officer. If approved by the Contracting Officer as an option, electronic submittals may be used and referenced in the contract, but no guidance on how the submittals were processed, which promoted inconsistency. This research used PDT (project delivery team) focus groups in order to uncover the challenges and obstacles of using paperless submittals on USACE projects. Recommendations and future research are also addressed in this paper.

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Keywords: Submittal, Paperless, RMS, Resident Management System, USACE, Construction, Shop Drawing

Introduction

Construction is a main reason the Corps is in existence. The Corps manages all sorts of projects across the planet, from military construction, public works, and work for other federal, state, local agencies. With over 200 years of existence, and over 35,000 employees, the Corps is entrenched with massive paperwork and bureaucracy. At the bottom depths of construction, at the foundation, the construction industry will find mounds and mounds of paperwork, commonly called submittals.

United States Army Corps of Engineers (USACE) utilizes a program, Resident Management System, affectionately called RMS. RMS assists field engineers, inspectors, construction representatives, contractor staff, and office personnel to perform their duties by providing computer programs and automation to plan, accomplish, and control the daily technical and administrative functions of construction projects managed by the U.S. Army Corps of Engineers. RMS provides a way to plan, schedule, and control all aspects of construction. Resident Management Policy has been provided from Army Contracting Command (ACC). (Project Management Plan for RMS)

Problem is…the Corps is having trouble keeping up with ever changing technology. Within the Federal Government, Department of Defense, Army, and Army Contracting Command (ACC), there have been several directives to go paperless. While the directives, rules, regulations, procedures, bulletins, policy, user guides, guide specifications, and a plethora of

other sources are in place; capability, capacity, and security are not. The Corps is actively working the transition from paper to paperless environment for the federal government's construction process. USACE RMS has not kept pace with ACC. RMS has had delays in its initial roll out of version 3.0(almost 4 years). USACE is not going to stop construction because of a broken process. The Corps must persevere and continuously improve RMS.

Background

The U.S. Army Corps of Engineers is a diverse workforce of professionals. Our mission is to provide quality and responsive engineering services for national interest. History and leadership help us meet the demands of changing times. The Corps is a vital part of the Army. The Corps takes pride in our work! The United States Army Corps of Engineers (USACE) is one of the largest public engineering, design, and construction management agencies in the world. Construction management is one of the main missions for USACE. USACE is a federal agency under the Department of Defense (DoD). The Army is a military department within the DoD, and USACE is a major command in the Army. (www.usace.army.mil)

If approved by the Contracting Officer as an option, electronic submittals may be used and referenced in the contract. Submittals transmitted in an electronic format shall meet all current Engineering Regulations, policies, and procedures concerning contractor submittals. The contractor shall provide a plan for effective use of electronic submittals, including ensuring a properly prepared single file structure for electronic submittals. The ProjNet's eSubmittal application (available through www.projnet.org) is USACE's secure, authorized application for electronic submittal transfers, reviews, and storage. The contractor's plan for use of electronic submittals must be reviewed and accepted by the government before start of work, and the plan shall ensure compatibility with the submittal register functionality in RMS. If approved by the Contracting Officer, the contractor may replace all paper submittals, except for color selections, samples, and mock-ups, with electronic submittals. Revisions, updates, or clarifications to the plan shall be made as requested by the government. RMS Quality Assurance / Quality Control (QA/QC) functions are designed to work directly with ProjNet eSubmittal to ensure automated data synchronization. ProjNet eSubmittal reports may also be used to assist in the production of electronic operation and maintenance manuals.

Contractor submittals shall be processed in accordance with ER 415-1-10. Contractors shall manage the work including scheduling, control, certification, and timely submittal of all contract submittals. Submittals shall be transmitted with Attachment B, ENG Form 4025-R, Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance, PDF, and PureEdge. (ER 415-1-10)

Purpose of Study/Research Objective

The purpose of this study was to provide guidance to make an effective transition from existing paper review process, to a paperless digital paradigm, while securely and effectively incorporating multiple requirements and constraints with multiple users. More specifically, how to process digital submittals uniformly and effectively within RMS provided the viability of RMS version 3.0.

1. Determine a standard operating procedure and uniform flow chart for digital submittals.
2. What are the potential courses of action for bridging from RMS version 2.38 to version 3.0?
3. Implement a beta test project to help owners, contractors, designers, construction managers, administrators, and software designers make the transition to RMS 3.0.

Rationale for the Study

To help the reader understand and effectively transition from paper to paperless, and moreover, from RMS 2.38 to RMS 3.0.

The transition to a paperless process does not have an adequate infrastructure in place to execute requirements. USACE does not yet have a fully working version of Resource Management System 3.0 in place to receive and store submittals. Army Corps of Engineers Information Technology (ACE-IT) does not have an approved software, secure network, and storage ability in place for the transition. Due to variation of requirements from person to person, office to office, and district to district, an increased probability for error, lost information, and conflict can arise. Can RMS, PD2, and ProjectWise work together?

A transition plan, with a coordinated effort and improved infrastructure, will help make the transition from paper to paperless, and more importantly, a place to receive, comment, document, and store submittals. To transition from RMS 2.38 to RMS 3.0, current policy needs review along with literature, communities of practice, and case studies to determine how challenges impact transition. The Project Delivery Team (PDT) will determine conflicts in policy, shortcomings in system (software, storage, security, etc.) and provide recommendations to overcome challenges in the process.

The PDT will initiate a standard operating procedure, review and beta test courses of action for viability, and provide uniform direction to users and developers to maximize productivity.

Research Design

The PDT was assembled to undertake the challenge of providing a uniform policy for processing submittals. A PDT is the Corps equivalent of a focus group. The PDT included members from design and contract management, with differing levels of experience, including students, interns, engineers, construction managers, and supervisors. The process in the past allowed the Contracting Officer to determine if electronic submittals were to be used, however there was no guidance on how the submittals were processed, which promoted inconsistency. Different software, programs, and various combinations were utilized to transfer and act as a clearinghouse. Those included Email, AMRDEK, ProjectWise, SharePoint – Contractor led, SharePoint – USACE led, and portable storage media, with 2.38 RMS. Each had their pros and cons for performance, but lacked uniformity, which led to increased chance of error.

PDT members introduced a method at our Division's yearly Construction Community of Practice (CoP). This was widely needed since RMS 3.0's rollout had fallen behind schedule by a couple of years. As the PDT worked for continuous improvement, the team produced a Standard Operating Procedure (SOP) and flow chart. The SOP or user's guide with a clear flowchart guidance identified all the different possibilities for submittals, including storage clearinghouse. The SOP was more of a user's manual than anything else, as it included 98 pages. The SOP allowed the flexibility for differing procurement methods with various software and programs. To simplify the SOP to less than 15 pages, the team looked to provide a recommendation for a singular software program.

Research papers, periodicals, and software product literature were reviewed for application for the private sector or other world-wide government agencies. The procedures and benefits of other methods were reviewed. This included lean construction, automated systems, different software, and best management practices. The PDT communicated with other districts pertaining to progression of the submittal process. The team compared, reviewed, and contrasted policy, procedures, and specifications of other districts.

12 PDT users were interviewed to ascertain a static mile-post and sanity check. Results and findings are provided. Findings are a snapshot in time, provided by interviewing each of the PDT members at the time of this paper. The interviews included reviewing, identifying, and recommending bridges to overcome shortcomings, as well as calibrating of the process. Regular team and user group meetings are held to provide instruction to the team and feedback to RMS helpdesk. Our SOP and flow chart are updated regularly.

Five options were analyzed.

1. AMRDEK/Email
2. ProjectWise
3. USACE Led SharePoint
4. Beta Test 3.0
5. Do nothing until 3.0 is rolled out.

Data Collection and Analysis

Data Collection

1. Reviewed current and past regulations, procedures, bulletins, Acts, policy and guidance from multiple references and interpretations. From the Government Paperwork Elimination Act (2000) to the Legal Review of Virtual Contracting Enterprise (VCE), Managed by Paperless Contract File (PCF), as a Repository for Routing, Storage, and Approval of the U.S. Army's Contract File Documents (27October 2015) and many in between.

2. Traced the intellectual progression of the paperless file, as well as, private sector procedures, lean construction, automation, and commercial software packages within research papers, periodicals, and product literature. While the commercial products and procedures researched lead the government sector, practical applicability due to reliability, regulation, and security, slowed the implementation.
3. Evaluated several sources for Federal guidance; Federal Acquisition Regulations, Army Contracting Command PCF Guidance, Engineering Regulations, and Guide Specifications, but it appears the most pertinent, to follow USACE command procedures; ER 415-10 CONTRACTOR SUBMITTAL PROCEDURES, DEPARTMENT OF THE ARMY. U.S. Army Corps of Engineers. 30 April 2012, Enterprise Standard (ES)-08033; Contractor Submittal Requirements, PMB Manual, https://pmbpmanual.lrl.ds.usace.army.mil/Qualtrax/Default.aspx?ID=2539; and Implementing Virtual Contracting Enterprise (VCE) Paperless Contract File (PCF) Initiative, ENGINEERING AND CONSTRUCTION BULLETIN, United States Army Corps of Engineers, 7 Jan 2013.
4. The PDT coauthored a SOP flowchart (see appendix A).
5. Working with others: LRH has been working with other Districts (LRP-Pittsburg District and SWT-Tulsa District) to examine how they are accomplishing electronic submittals. They have provided LRH with specification sections, internal submittal SOPs, checklists, and lessons learned regarding their electronic submittal process. Some of this information will be used on future LRH Contracts, including the Bolivar Abutment Restoration Project.
6. The Huntington District (LRH) has successfully performed similar versions of the electronic submittal process on previous and current projects; Bolivar Seepage Barrier, Bolivar Service Gates, Town of Martin - City Hall/Police Station, and Town of Martin - Alternative School. The Bolivar Abutment Restoration Project will also utilize this current electronic submittal process. Options on one through three had been utilized in the past. The PDT members provided feedback based on empirical data and research, reviewed, and assessed the first three options. Recommendations were provided and presented to supervisors within the Engineering and Construction chain of command for approval and buy -in of proposed procedure. Buy-in allowed for further discussions with Army Corps of Engineers Information Technology (ACE-IT), Division, and ultimately, Headquarters USACE.
7. Where the rubber hits the road, practical application. Implementation of a Beta project of RMS 3.0.
8. Feedback loop to allow for continuous improvement. Regular discussions and meetings to overcome challenges within a dynamic situation.
9. 12 users were interviewed to ascertain a static milepost and sanity check. Results and findings are provided.

Analysis

The three (options) courses of action (COA) were initially analyzed; AMRDEC/email, ProjectWise (PW), and SharePoint (SP).

1. AMRDEC/Email was limited in its use. AMRDEC provides a means for sending large files from a single person to multiple users when email could not handle the attachment size. It required a password, and allowed for extraction for a limited time. Its tracking ability was limited and could not be used as a clearinghouse (central access location). Misplacement of submittals via Email/AMRDEC were problematic. Utilizing previous versions of the electronic submittal process, with the abundance of submittals received/sent via email & AMRDEC, occasionally submittals tend to get lost within daily emails. With this electronic submittal process, the use of the SharePoint/ProjectWise should eliminate lost submittals. SAFE is designed to provide U. S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC) and its customers an alternative way to send files other than email. (https//safe.amrdec.army.mil/safe) It is utilized by other federal agencies for secure transfer of large documents.
2. ProjectWise (PW) was our preferred option. ProjectWise is the standard method for lifecycle document management. (Draft ECB-TBD) PW has add-in modules that contains the tools to perform desired results for document management. (www.bently.com) Once approval and buy-in was obtained from our chain of command, discussions ensued with ACE-IT. From research, outlook was hopeful, but it was anticipated from previous encounters with ACE-IT that implementation may be a challenge. Two major problems arose upon discussion from ACE-IT, time and existing PW version didn't support the cloud add-in required to implement process. Great Lakes and Ohio River Division intends to implement ProjectWise as the project and file collaboration and storage

tool NLT 30 SEP 2018 to enhance regional operations. (OPORD 2016-007) The revised timeline for RMS 3.0 implementation is NLT 31 DEC 2017.

3. SharePoint has preferred functionality of automated notifications of when documents are added/deleted/modified, when things are coming due, and calendar reminders. The Corps of Engineers use SharePoint. Due to security concerns and file size capacity, the team discovered that our use of SharePoint was limited to two types; internal use, by USACE employees only, and contractor led. (www.sharepoint.com)

Interview Questions, Comments, and Findings

Questions

1. How does paperless impact process timeline? Why?
2. How is the paperless system impacting effort to process? Why?
3. Does RMS 3.0 (increase, decrease, the same) increase the chance for error? Why?
4. What options are you implementing when uploading submittals in RMS 3.0 fails?
    a. Email
    b. AMRDEK
    c. SharePoint
    d. ProjectWise
    e. other.
5. What are you doing when to promote paperless or the operability of RMS 3.0?
    a. Using 2.38 and 3.0 simultaneously
    b. Beta testing
    c. User group training
    d. Nothing, waiting on 3.0 to work correctly
    e. Call problems to helpdesk
    f. Playing with the program
    g. SharePoint
    h. Other
6. How many submittals do you review in week?
7. How much time do you spend on submittals?
8. Position?
9. Do you have RMS 3.0?

Results provided in Appendix 1.

Comments

The Good

1. Saves the Government time and money.
2. Less unnecessary handling.
3. Tracking. Very little time to generate a report.
4. Easier to find submittal in the process, or for instant availability in the field to see requirement.
5. Beta test experience: LRH has successfully performed similar versions of the electronic submittal process on previous and current projects; Bolivar Seepage Barrier, Bolivar Service Gates, Town of Martin - City Hall/Police Station, and Town of Martin - Alternative School. The Bolivar Abutment Restoration Project will utilize RMS 3.0.
6. Collaborating with other districts: LRH has been working with other Districts; LRP – Pittsburg District and SWT-Tulsa District to examine how they are accomplishing electronic submittals. LRP and SWT have provided LRH with specification sections, internal submittal SOPs, checklists, and lessons learned regarding their Electronic Submittal Process. Some of this information will be used on future LRH Contracts, including the Bolivar Abutment Restoration Project.
7. Less paper: The reduction of unneeded paper copies of submittals. This process only requires Contractors to provide the Government two (2) hard copies of submittals for our Contract File Copy & the Inspector Copy. In the past, USACE have required the Contactor to provide six (6) hard copies of all submittals. All Electronic Submittals are stored and received/sent digitally. Providing a savings on postage and paper, for the Government and our Contractors.

8. The Electronic Submittal Process is much faster: USACE do not have to wait on postal services to obtain and return submittal back and forth with the Contractor and Submittal Reviewers. Submittal Reviewers can begin submittal review the day it received from the Contractor and Contractors can obtain the completed submittal the day of approval.
9. Comments into RMS: Engineering provides submittal review comments directly into RMS.
10. Electronic submittals can be accessed anywhere: Within the District Office, in the field, on mobile phones, and tablets, without having to locate the hard copies in filing cabinets or transport hard copies to the field.
11. Reduces error. Misplacement of submittals via paper, Email/AMRDEC: Utilizing previous versions of the electronic submittal process, with the abundance of submittals received/sent via email & AMRDEC, occasionally submittals tend to get lost within our daily emails. The use of RMS 3.0 with ProjectWise should eliminate lost submittals.

The Ugly

1. Tracking of submittals that are "in review": This current process is not an efficient means to track where a submittal is currently in review with the Resident Engineer, with the Lead Engineer, with the Technical Engineer. This Process requires personnel that handle a submittal at any point to manually enter tracking dates and recipient names into the RMS Submittal Comments block, so that anyone that needs to know where a submittal is in review can access this information. A technician will be assigned this duty in the future. A standard operating description is in the works, with applicable position description.
2. Misplacing final submittals within ProjectWise: Construction Submittal Coordinators do a great job at placing the final submittal into ProjectWise. Occasionally this does not occur. This process has included several "checks" to ensure that process error is minimized, but human error can still transpire.
3. Field Connections: ProjectWise and RMS are running via network connections; this process will be frustrating to field personnel when connectivity is limited.

Areas of Improvement

1. Permanent storage of electronic submittals: Currently LRH is storing electronic submittals within the RMS "Contract File", on ProjectWise, on the local networks, and now on SharePoint. Some of these storage locations are redundancies, but some are required. It is unknown to LRH if the RMS "Contract File/Paperless Contract File (PCF)" storage can be accessed once a Contract is "Archived" in RMS. Is RMS/ a good a long-term storage location? LRH needs to further investigate permanent storage possibilities to eliminate these redundancies. (OPORD 2016-007)
2. "How-To" Presentation: Providing an Electronic Submittal Process Presentation to all of Engineering and Construction personnel that handle/review Submittals. Giving systematic instructions on this process, answering questions, and providing explanations on why some of these steps the way they are.
3. Continually improve the "Living" Flowchart and SOP (PowerPoint): The Flowchart and SOP (PowerPoint), are "living" documents and most likely will need to revise/change as programs and situations change. However, the PDT would like to "finalize" these so that a new person to the District or new to this process can take these two documents and fully complete their portion of a submittal without help.

Findings

The findings for this topic were provided by a focus group, or as it is called in the Corps, a PDT. The PDT provided initial recommendations to management, and was subsequently approved. Findings are a snapshot in time, provided by interviewing of each of the PDT members at the time of this paper. Calibration of our process includes reviewing, identifying, and recommending bridges to overcome shortcomings. Regular team and user group meetings are held to provide instruction to the team and feedback to RMS helpdesk. Our SOP and flow chart are updated regularly.

Beta testing of RMS 3.0 is occurring on the Bolivar Abutment Restoration Project. Implementation of 3.0 was a contractual obligation for the contractor and the Government. Neither had fully implemented 3.0 at the time of award. Once the contractor implemented 3.0 there was no going back to using 2.38. It was published (https://lrh.intranet.army.mil) to district leads that the newer contractor 3.0 version was ready for roll out, but USACE side was still under construction and had some bugs to work out. USACE administrators have been given the ability to process submittals in 2.38 and 3.0. The Contractor had not even started the implementation process. The process needed to be flexible once shortcomings were discovered.

Two interesting things happened prior to the contractor upgrading his version of RMS 2.38 to RMS 3.0; district headquarters prematurely required closing the field office by 31 DEC 2017 and a modification to the contract, the abutment had a soil slip.

To keep this project tracking to meet a challenging schedule, and to expedite Notice to Proceed (NTP), the contractor was required to email his initial submittals, while initiating RMS 3.0. High priority was given to the review of the initial submittals. The submittals were temporarily processed in USACE share drive and stored in PW. Since implementing RMS 3.0, the contractor continues to have learning curve problems. A user manual has been developed to assist the contractor to utilize RMS 3.0. The project engineer (contract management) and lead engineer (civil design) have led the implementation of RMS 3.0 with the contractor and field personnel, while reviewing, identifying, and recommending bridges to overcome shortcomings. Regular team and user group meetings are held to provide instruction to the team and feedback to RMS helpdesk. Our SOP and flow chart are updated regularly. The Project Engineer (PE) has had to provide additional assistance to the Contractor for this implementation.

The PE has provided the Contractor:

1. A SOP on how to process a submittal.
2. PE has contacted help desk for feedback and patch support.
3. Directions to resolve shortcomings, with follow-up work to keep contract file up to date.
4. RMS 3.0 Power Point Workshop for general Contractor use.

Implementation for Beta project is initially cumbersome, requiring extensive communication, follow-up, and re-work. RMS 2.38 and RMS 3.0 need to be open in two separate screens to process submittals. Direct storage of submittal in RMS is helpful to quickly access files and reports. Construction season is a challenging time for Beta testing.

Every interviewee concluded that paperless will save the government money, improve the project timeline, and require less effort to process. 92% believe RMS once fully implemented will reduce the chance for error. Like every new or modified software package, there is a learning curve associated with its implementation. The learning curve is challenging when dealing with small businesses that have limited personnel.

The PDT was genuinely excited with the concept of two computer programs to process submittals. The less email, programs, or software to process submittals, and the more streamlined “one stop shop” is provided, the better the process. With RMS 3.0 to be completely implemented by year’s end, the Corps of Engineers has finally caught up with the information age. USACE has provided direction in Operational Orders combination of RMS and PW will be the two main programs that Engineering and Construction will use. Construction is married to RMS and with the unknowns of RMS 3.0 capabilities, the PDT can take advantage of reducing from three (3) software programs to two (2) software programs.

Great excitement ensued with the PDT, as it was discovered that ProjectWise, the project and file collaboration and storage tool, contained elements for real time information tracking. The problem is that the latest version is still in ACE-IT getting approved. From our research, PW Deliverables has real-time tracking and helps with accountability. Pre-sets keep process moving with notifications and a Dashboard. The PW software is extremely user friendly and familiar, as USACE is currently all working in PW. The PW automation is much like the SharePoint automation, but adds the automated feature of archiving, as well while ensuring packages are intact. “Packages” is what PW calls a submittal package. Packages are created by contractor and sent via cloud. Like sending zip files, PW will set files to keep content intact, large, and small. The difference is, it is set up and maintained automatically throughout the process. Archiving is a huge portion of the current process, which is flawed with naming conventions not matching, and lost files which can all be fixed automatically with this add-in cloud. A RFI process is built in to this add-in. It appears that PW will help streamline the current RFI process.

Conclusions and Future Research

From the results of this study, USACE can conclude that transitioning to RMS 3.0 and going from paper to paperless will be a cost, time, and effort savings once implementation can occur. Continued bridging efforts by the PDT and staff will continue.

Conclusions

1. Saves the Government time and money.
2. Less unnecessary handling.

3. Quicker and Easier Tracking. Very little time to generate a report.
4. Easier to find submittal in the process, or for instant availability in the field to see requirement.
5. Successful beta testing experience.
6. Collaboration promotes effectiveness and economy of scale.
7. Less paper.
8. The electronic submittal process is much faster.
9. Engineering provides submittal review comments directly into RMS.
10. Electronic submittals can be accessed anywhere.
11. Reduces error.

Future Transition

1. The use of paper, scanning, email, AMRDEC, and other uses of transferrable devices.
2. Implementation of a fully functional RMS 3.0.
3. Contractor Training.
4. USACE Training. "Train the Trainer"
5. Revised master specifications for submittals.
6. Revised roles and responsibilities to accommodate the change in basic assumptions from paper to paperless.
7. Improved hardware and software.
8. Process security.

Future Research

1. Permanent Storage of electronic submittals:
2. "How-To" presentations.
3. Finalize the "Living" flowchart and SOP (PowerPoint).
4. A contractor's RMS 3.0 user manual, SOP, or power point to assist in productivity, which will promote "partnering" and good will.
5. A technician will be assigned as submittal technician in the future. A personnel description is in the works.

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