Effective E-mail Communication for Optimization of Time and Cost in EPC Projects as Intellectual Property Management

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Abstract— **E-mails are one of the most frequently used and authentic means of communication during engineering and design phase of various EPC projects. An effective e-mail communication can positively impact the cost and schedule of project deliverables. In this work, we studied various factors which affect quality and flow of mails in various disciplines of engineering design. Some of those factors are: number of senders/recipients, trailing mails, attachments, subject and main body of e-mail. Good management of e-mails and its folders at personal level can be helpful to prepare work plans and to set priorities of actions to be taken by individuals. It has also been mentioned that how e-mails can be considered and managed as an Intellectual Property Asset of project (or client) like other documents and standards.**

Index Terms— **E-mails, EPC, Time, Cost, Documentation, IP Management**

I. INTRODUCTION

E-mail being one of the most frequent form of communication in EPC sector, where projects are executed on a work-share basis and information is passed through mails to different offices, clients, vendors, fabricators and sub groups. An e-mail is considered as a valid document in decision making process and can be used for future references. Hence a detailed, precise and proper e-mail communication is very important. E-mails are considered as one of the Intellectual Property Assets of an EPC project. E-mail management and documentation is as important as other project standards and references. Time (in terms of Man Hours cost) involved in writing, attachment preparation, reading and
understanding of an e-mail is generally neglected, but it impacts schedule and cost in EPC projects.

II. PROBLEM STATEMENT

This is a very well-known fact that average time taken in writing, reading, understanding and responding to an e-mail varies from person to person. Hence, it becomes necessary to optimize e-mail structure and to manage flow of e-mail communication. Figure-1 depicts a typical example of flow of a design related e-mail. It is observed that as the number of inter departmental communications are increased, the

complexity of e-mail and cycle time increased. In this study paper, our aim is to identify those factors which impact the quality and time involved in e-mail communication specific to Engineering Design in Energy & Chemicals areas of EPC sector.

III. OBJECTIVES OF WORK

Major objectives of this study work are as follows -
(a) Identify governing factors in design related e-mails of EPC projects which impact time, cost and quality of e-mail communication.
(b) To formulate general calculation of Man Hours consumed in e-mail communication in a specific case i.e. *time taken by recipients only.*
(c) To study impacting factors and suggest possible solutions to effectively manage e-mail communication chains or cycles in EPC projects.

IV. A TYPICAL STRUCTURE OF ENGINEERING DESIGN RELATED E-MAIL IN EPC PROJECTS

E-mail being one of the most important forms of communication in an EPC project. A good e-mail can lead to a good intellectual document and a bad email can lead to a wrong decision. Hence, e-mail formatting plays an important role in EPC firm where major design related issues are resolved and documented through emails.
Following are the important parts of an Engineering design related e-mail, which impacts the quality and effectiveness of e-mail –

A. Sender

The priority of action to be taken on an e-mail by recipients can be set as per type of Sender. Also, if same e-mail is sent by different (many) senders to same recipients with different conclusions on actions to be taken by them; creates confusion and time taken in closing out the e-mail cycle gets increased.

B. Recipients

The first and the foremost thing to be considered while writing an effective e-mail is to decide - To whom it may concern. Preferably single person is mentioned in 'To' because if more than one person is added in 'To' it will create ambiguity, for whom the action is required, unless it is mentioned in mail below. The created ambiguity may either lead to no action or multiple actions from different receivers.

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C. Carbon Copy

The person to whom it is affecting indirectly should also be considered, while sending inter-departmental emails, so that everyone is aligned with changes, information and decisions by keeping relevant person in Cc.

D. Blind Carbon Copy

Bcc recipients are hidden from the other recipients, hence a Bcc recipient cannot see other Bcc recipients and can acquire the required information. It can be used to minimize 'FYI' type mails by keeping people in Bcc.

E. Subject

It is the first part of communication which is observed by the receiver. The subject itself sets the priority of e-mail among other e-mails at receiver's end. Subject should be short, specific, clear and concise. It should summarize the body of the e-mail. For short messages, subject line can only be used to convey the whole message rather than writing specifically in the body again. During interdisciplinary communications, the group/discipline must ensure consistency to maintain similar subject line for similar type of mails, which will help in future when particular e-mail is required.When an e-mail is being used for a different purpose than stated earlier, then the subject line should be modified w.r.t recent or final requirement of e-mail.

F. Body of Mail

The body of a technical e-mail is divided in various parts-
The salutation is how you greet the recipient. It's really important to understand the importance of greetings in e-mails; it can actually set the tone of the mail.
Body Text conveys main message of an email. Since, in EPC project it acts as a document itself and hence like other documents, e-mails should be considered as project's intellectual property. Body text should be clear, simple and precise. Instead of writing in paragraphs, it must be written in bullet points so that it is easy for reader to understand the given information in minimum possible time. Wherever required, colour-coding and text formatting should be used in texts. Queries can be replied in different colour w.r.t bullet points. If mail requires any quick action then COB date should be mentioned. A good conclusion of mail saves a lot of time for those mails, which are sent only for information. Attachments make things handy for the receiver, one need not to search for concerned documents that being referred in the e-mail by the sender. This would make the work easier and would take less time to respond. Rather than sending the entire document, one should attach only relevant part of the file to save mail-box space. A good snapshot says everything instead of complex mail body. The last but not the least, signature plays an important role. It should include contact details, department, designation and location of the sender so that if the recipient has any query regarding the e-mail he can contact the sender through multiple ways to reduce cycle time of an e-mail. Sometimes, signature is helpful to prioritize actions taken by recipient.
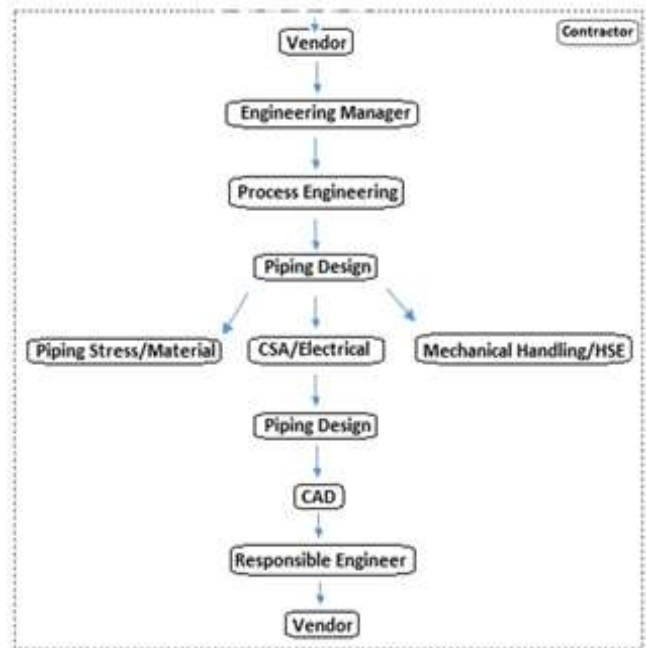

Fig 1. Typical example of flow of a design related e-mail due to change in equipment GAD

V. TYPICAL EXAMPLE OF COST ANALYSIS OF EFFECTIVE E-MAIL COMMUNICATIONS IN EPC PROJECTS

Time taken in reading and writing e-mails is a cost impact factor in e-mail communication in EPC projects, because most of the project work is assigned as per Man Hours.

A. Factors considered in calculation of Man Hour consumed by recipients only

(a) Total No. of mails received by one recipient during entire project = **N**
(b) No. of recipients in one mail = **r**
(c) No. of trailing mails in one mail = **m**
(d) Average time (in minutes) taken in reading and understanding of one trailing mail by one recipient = **t**
(e) Man Hour cost for project (per hour) = **$ R**
(f) Cost associated with complexity of email structure (constant) = **c**

Following equations can be used for different calculations of time and cost involved in e-mail communication. (Refer Figures 3 and 4)

(a) Total time taken by one recipient consumed in reading and understanding of one mail = **(m x t) mins**
(b) Total time taken by all recipients consumed in reading and understanding of one mail = **(r x m x t) mins**
(c) Total time taken by all recipients consumed in reading and understanding of all mails during entire project = **(N x r x m x t) mins**
(d) Total cost involved in reading and understanding of all mails by all recipients during entire project = $ **[{(N x r x m x t) x R} / 60 + c]**
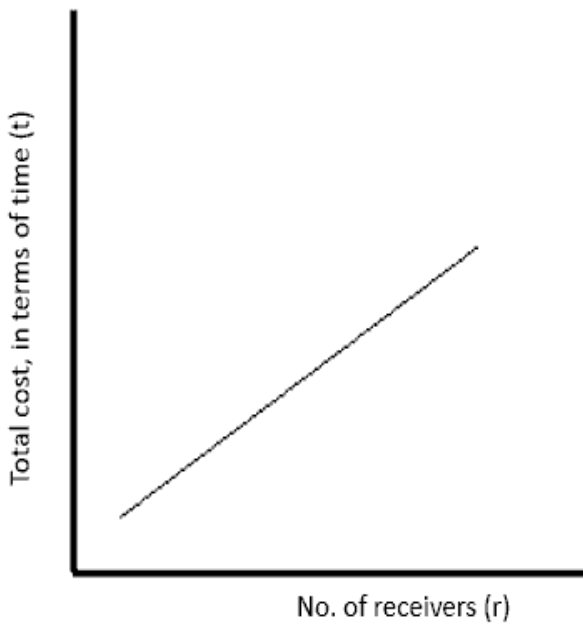
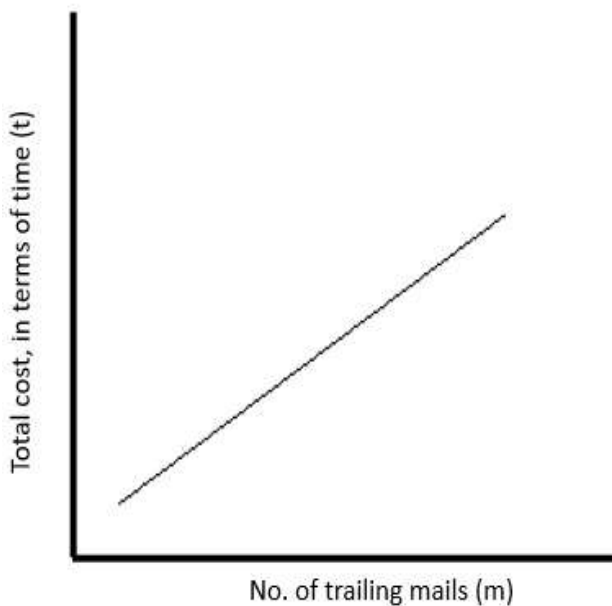**Fig-2.** When reading time per user is considered same

Fig-3. When reading time per trailing mail is considered same

VI.   HOW MAN-HOUR CONSUMPTION IN E-MAIL COMMUNICATION CAN BE EFFECTIVELY REDUCED BY OPTIMIZING AFFECTING FACTORS

(b)   Total No. of e-mails received by one recipient during entire project (N)

A good part of one's day is utilized in reading and writing emails. Especially, people in the managerial roles like team leads and supervisors; most of their time in office is consumed by emails. In some cases, one's time is consumed in reading and understanding what doesn't even concern them. So, it is really important to decide first whom the email would concern.

(c)   No. of recipients in one e-mail (r)

By judiciously deciding upon the receivers list in an e-mail, one can reduce this factor. Also, including only the concerned individuals would ensure prompt action as there won't be any delays due to unnecessary discussions.

(d)   No. of trailing mails in one mail (m)

Many discussions are carried over e-mails and hence by the time conclusion is reached it becomes a long thread. Now, while forwarding the same e-mail for further action to another group the sender must remove the unnecessary part of the communication so that the receiver's time is not consumed in reading the entire conversation and can get the message quickly. However, historical data may be lost due to optimization of chain by removing its trailing mail(s).

(e)   Average time (in minutes) taken in reading and understanding of one trailing mail by one recipient (t)

When team leads forward an important information to their groups which is recorded in a thread of e-mail communication, they can summarize it for the receivers. It will help each of the receivers to understand their specific action.

(f) Complexity of email structure (c)

A complex e-mail leads higher time consumption in reading and understanding by receivers. Sometimes, it further requires phone calls, video conferences or meetings for clarification of a complex mail. Detailed snapshots/sketches, relevant attachments, pointwise message, precise and simple text can reduce this complexity and can further save time and cost involved in all means of communications.

VII.   INTELLECTUAL PROPERTY MANAGEMENT OF E-MAILS IN EPC PROJECTS

E-mails are as important as other project documents.
(g)   E-mails should be kept in relevant files in printed (hard copy) format for future references.
(h)   A very specific and effective subject-line helps in better tracking of multiple e-mails of same chain of trailing e-mails in sent and received e-mail folders.
(i) E-mails can easily be found by Date, by Subject, by Sender or by Recipients and can be referred and attached in other e-mails.
(j) Sent e-mails can be filtered by Date and can be used to prepare Daily or Weekly Work Plan as required by project management or client.
(k)   E-mails must be archived before they are removed from inbox/sent mail folders. This practice is very useful in those EPC projects, which are scheduled for long period of time.
(l) E-mails are used as supporting documents during various decision making processes in Engineering Design i.e. PCN, DCN, SIQ, FEQ, FIQ, Changes in design or

deliverables and layout modifications of different deliverables like isometrics, drawings, layouts, Line List, reports, datasheets and plot plans etc.

standards. An individual can effectively manage his/her work plans by managing e-mails.

VIII. FUTURE SCOPE OF WORK

Section-IV of this paper explains a typical example of Man Hours calculation for a very specific case i.e. *Time consumed by many recipients in responding a mail having number of trailing mails.* There are many other considerations that can be taken during calculation of cost involved in mail communication in terms of time consumed by users. Following are some future work recommendations of such possible cases–

(m) Time consumed by originator of e-mail that involves discussion, preparation of snapshots, arrangement of references, writing of main body and management of flow of communication.

(n) Time consumed by an intermediate sender of e-mail (like a team lead) that involves reading and understanding of mail before making a conclusive mail for respective actions to be taken by his team members.

(o) Comparison of time taken in writing and understanding of e-mails based on complexity, which is driven by long phrases or clear and descriptive snapshots.

(p) A survey can be conducted among employees on their experiences learnt on e-mail communications.

(q) A study can be performed on cost-schedule impact of mismanagement of e-mails and a delay in response on e-mails and so on.

IX. CONCLUSIONS

Cost involved in e-mail communications and their impacts can be studied under different circumstances and desired results can be achieved at smaller or larger scale. However, barriers can't be fully eliminated, but they can definitely be reduced by providing proper training to users in e-mail communication. Following are some general conclusion of this study work –

(r) There is always a cost associated with e-mail communications in terms of Man Hours in EPC projects. It generally depends on number of senders/recipients, number of trailing e-mails, different actions taken on the same e-mail by different recipients, complexity of e-mail, lack of detailed references in attachments and flow direction of communication chain.

(s) Time taken in preparation, writing, understanding and responding a design related e-mail varies as per users, structure of mail and complexity of flow of communication.

(t) E-mail parts i.e. Sender, Receiver(s), Cc, Bcc, Subject, Attachments, Snapshots, Signature, Colour coding and schedule etc. play an important role to decide complexity and flow of communication. It further impacts total duration of close-out of e-mail-cycle as soon as possible.

(u) An optimized and organized e-mail communication can positively impact the Schedule and Cost involved in an EPC project.

(v) E-mail management can be considered as an Intellectual Property Management like other project documents and

II. APPENDIX

EPC - Engineering, Procurement and Construction
DCN - Design Change Notice
PCN - P&ID Change Notice
SIQ - Site Informal Queries
FEQ - Fabrication Engineering Queries
FIQ - Fabrication Informal Queries
CSA - Civil-Structural-Architecture
COB - Close of Business
IPM - Intellectual Property Management
Cc - Carbon Copy
Bcc - Blind Carbon Copy
FYI/FYA - For Your Information / For Your Action

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REFERENCES

[1] http://www.fluor.com/projects, official website of Fluor® Daniel India Pvt. Ltd. (visited on 5-May-2018)
[2] www.fluor.com, official website of global Fluor® Corporation. Visit for client markets, services and to know more about Fluor.