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PERFORMANCE OF REQUEST FOR INFORMATION (RFI) MANAGEMENT

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Request for information (RFI) is considered as one of the important administrative tools in construction projects. It can be used as an indicator on how well the coordination between parties, especially between contractors and engineers and/or supervisors, performed in a project. Delays in a construction project could be identified by analyzing the RFI documents, but on the other hand, they could also be caused by poor administrative in handling the RFI documents and by delays in processing RFIs. This paper reviews the performance of four building projects in handling their RFI documents. The four buildings were constructed by a national joint-operation contractor, designed and supervised by an international joint-operation consultant. The RFI responses and wok-in-process were used to measure the project's performance in handling the RFI documents; from the contractor's and the engineer's point of views. The analysis results show that the engineer had been very responsive in processing RFIs, while the contractor had difficulties. In general, the contractor was lack of capable personnel in handling RFIs for all four buildings. Moreover, communication problem was the key of the project's performance due to different language and culture. The authors believed that the results of the analysis would influence to the overall project performance.

Keywords: Contractor, Documentation, Engineer, Response, Work-in-process.

1 INTRODUCTION

According to Lee and Larry (2009), a good project management practice is determined by its organization structure and information system. Communication and distribution of data and information related to all project activities in the field to all stakeholders of the project is then crucial to its success. The fragmentation problem of the construction industry makes good communication and robust information management in a project is a must (Dave and Koskela 2009).

Moreover, it is not uncommon that construction design documents, i.e., design drawings, technical specification, and quantities, are far from perfect to be built by the contractors. It is a contractor's duty to identify the imperfections existed in the construction documents and then to coordinate with the engineer, or the owner's representative in the field to find the solutions. Sometimes, the designer should be involved in solving such problems. In this kind of situation, the RFI or Request for Information procedure is widely used in construction projects. It is a formal procedure raised by contractor to confirm the interpretation of specification and drawings, or to secure a documented directive from the engineer, or the owner's representative before continuing the works (Tadt *et al.* 2012). RFI could be considered as one of the important administrative tools in construction projects. It can be used as an indicator on how well the coordination between parties, especially between contractors and engineers and/or supervisors, performed in a project. Delays in a construction project could be identified by analyzing the RFI documents, but on the other hand, they could also be caused by poor administrative in handling the RFI documents and by delays in processing RFIs. RFI processes need time to conduct and will influence the schedule performance of a project (Mohamed *et al.* 1999).

This paper reviews the performance of a project, constructing four buildings in a university complex, in handling the RFI documents. The need for the review was coming from the fact, as the research was taken, that the contractor's performance was considered already behind schedule and the contractor claimed that the reason for the delay was from the engineers' side in responding the contractor's RFIs. The authors were informally involved in this investigation to give impartial information to the owner.

2 THE FOUR-BUILDING PROJECT

The case study used in the research was a four-building project in a university campus, in Bandung city, Indonesia. There were four different buildings located on different locations at the campus complex and constructed by a national joint-operation contractor. In general, the buildings have 6 to 7 stories and similar functions for accommodating lecture rooms, laboratories, faculty rooms, and offices. The contractor decided to have four different field and engineering teams; while for administrative and management matters were centralized. The contractor had a contract of 18.75 Million USD that should be finished in 18 months. The project was considered as an international construction project and the English was used as the formal language in the project.

On the other side, the owner was supported by an engineering and supervision services consultant to design the buildings as well as to supervise the construction process. The consultant was an international joint-operation consultant (further referred as engineer); a Japanese consultant and two Indonesian consultants. For engineering works and supervision, the Japanese consultant held a role as the leader.

During the construction process, the contractor frequently complained on the stringent supervision by the engineer. The contractor also found some imperfect construction drawings and specification that led to issuance of RFI to the engineer. The communication related to RFI was considered a lengthy process and might cause a delay to the actual works. Misunderstanding and different views of the issues discussed in RFIs were common. Delays and slowing down progresses of some construction works were obviously noticed. The contractor claimed that RFI process might cause the project performance and the lengthy process of RFIs were caused by inability of the engineer to respond them. On the other hand, the engineer pointed the cause of it to the contractor.

3 METHODOLOGY

The authors were informally engaged to the project to investigate the situation and to provide recommendation to the owner to solve the problem after the project underwent 375 days or about 13 months, with only less than 50% progress. In order to achieve the objective of the investigation, 1,876 RFI documents were collected and the following analyses were used:

1. Categorize all RFIs using an expanded-classification suggested by Tilley *et al.* (1997). They are:
   (a) Design Alternative
   (b) Approval
   (c) Confirmation
   (d) Clarification
2. Measure the Response Performance Indicator (PI_2) as suggested by Tilley *et al.* (1997), where:

$$PI_2 = \frac{1}{N_c} \sum \frac{T_a - T_r}{T_a} \tag{1}$$

Where
N_c = Number of RFIs
T_r = Maximum response time of RFI as written in the contract (day)
T_a = Actual response time of each RFI (day)

3. Measure the Work-in-Process Indicator (*Average WIP*) as suggested by Chin (2009), where:

$$Average\ WIP = \frac{Total\ Number\ of\ WIP}{Project\ Duration} \tag{2}$$

4. Measure the On-Time Rate Indicator (*OTR*) as suggested by Chin (2009), where:

$$OTR = \frac{Number\ of\ On\text{-}Time\ and\ Earlier\ Delivered\ RFIs}{Total\ Number\ of\ RFIs} \tag{3}$$

5. Measure the Documentation Quality Indicator (PI_1) as suggested by Tilley *et al.* (1997), where:

$$PI_1 = \frac{N_c}{CV \times D} \tag{4}$$

Where:
N_c = Number of RFIs in ‘Clarification’ category
CV = Contract Value (in 100.000 AUD)
D = Initial project duration (month

4 ANALYSIS AND DISCUSSION

4.1 RFIs Documents

Based on 1,876 RFIs, as depicted in Table 1, there were only few RFIs that could be categorized as design alternative (0.37%), confirmation (0.05%), and clarification (0.43%). Most of the RFIs were approvals related RFIs (99.15%). Based on further analysis, the approvals related RFIs consisted of document for approving the drawings (60.43%), submitted materials (9.25%), and work permits (30.32%) as depicted in Table 2.

It can be said that if the project were delayed because of RFIs, then late approval of work permit due to unready site for the work and efforts related to detailing the drawings for construction would be the causes. The findings raised an issue of technical personnel’s’ and sub-contractors’ competences in fulfilling the requirements given by the engineer. The issue of poor communication between contractor and engineer would also be the case due to different culture and language.

Table 1. RFIs category of the case study.

RFIs	Frequency	Percentage
Design Alternative	7	0.37%
Approvals	1,860	99.15%
Confirmation	1	0.05%
Clarification	8	0.43%
Total	1,876	100.00%

Table 2. Approval RFIs category.

RFIs	Frequency	Percentage
Drawings	1,124	60.43%
Materials	172	9.25%
Work Permit	564	30.32%
Total	1,860	100.00%

4.2 Response Performance

It was informed from the agreement between parties in the project, that the maximum response time for RFI was 3 days (T_r). The actual response time of all RFIs were calculated (T_a), and by using Eq. 1, the Response Performance Indicator (PI_2) was found to be 0.094. Based on a graphic provided in Tilley *et al.* (1997), the PI_2 = 0.094 was plotted on the graphic and found that the response performance could be categorized as a 'Good'. It means that the response from the engineer is timely, and therefore there should be no complain on engineer's performance in responding the RFIs.

4.3 Work-in-Process of RFIs

In order to calculate the Work-in-Process Indicator, the total number of work-in-process (*WIP*) should be calculated first. The RFI's dates of submission and return were identified, and the daily number of RFIs that were being processed by the engineer could be calculated. For 375 days, it was found that total number of work-in-process RFIs was 6,297 RFI-day. Using Eq. 2, the average RFIs that were being processed by the engineer was 16.8 RFIs daily. The distribution of daily work-in-process RFIs is depicted in Figure 1. The maximum WIP was 67 RFIs daily.

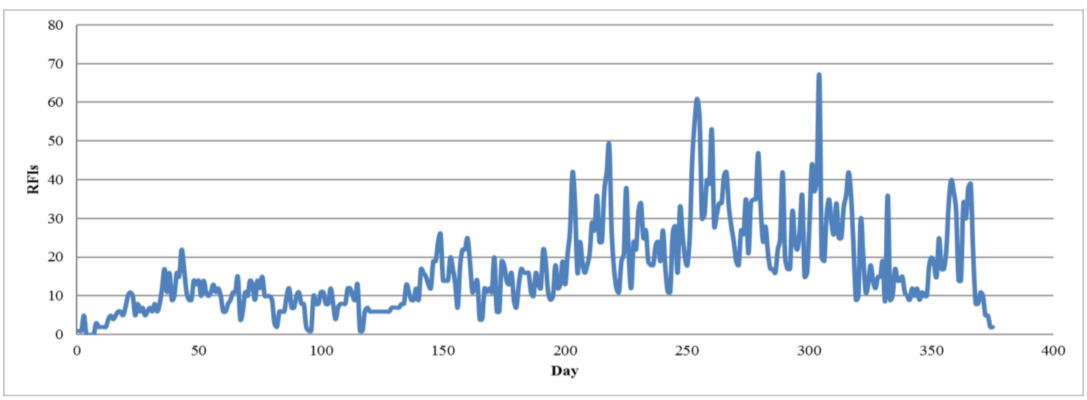

Figure 1. Daily work-in-process RFIs.

4.4 On-Time Rates Performance

Moreover, to get the information on how good the engineer's response to each RFI the contractor gave, the on-time rates of RFIs was calculated as suggested in Eq. 3. For that purpose, the Figure 2 is important to be shown. It can be seen that there were 1,506 RFIs that were responded on time or sooner by the engineer. And therefore, the OTR was 80.28% with average time needed to respond RFI was 2.45 days. This is still less than the maximum days needed to respond the RFI as written in the contract, which is 3 days. As previously stated, the engineer did a good job in responding RFIs from the contractor by processing 16.8 RFIs in average daily. From the interview with the engineer, maximum capacity of the engineer to process the RFIs was 60 RFIs per day since there were 6 technical personnel that could process 12 RFIs daily. It also means that the utility of technical personnel of the engineer was still low, only 28%.

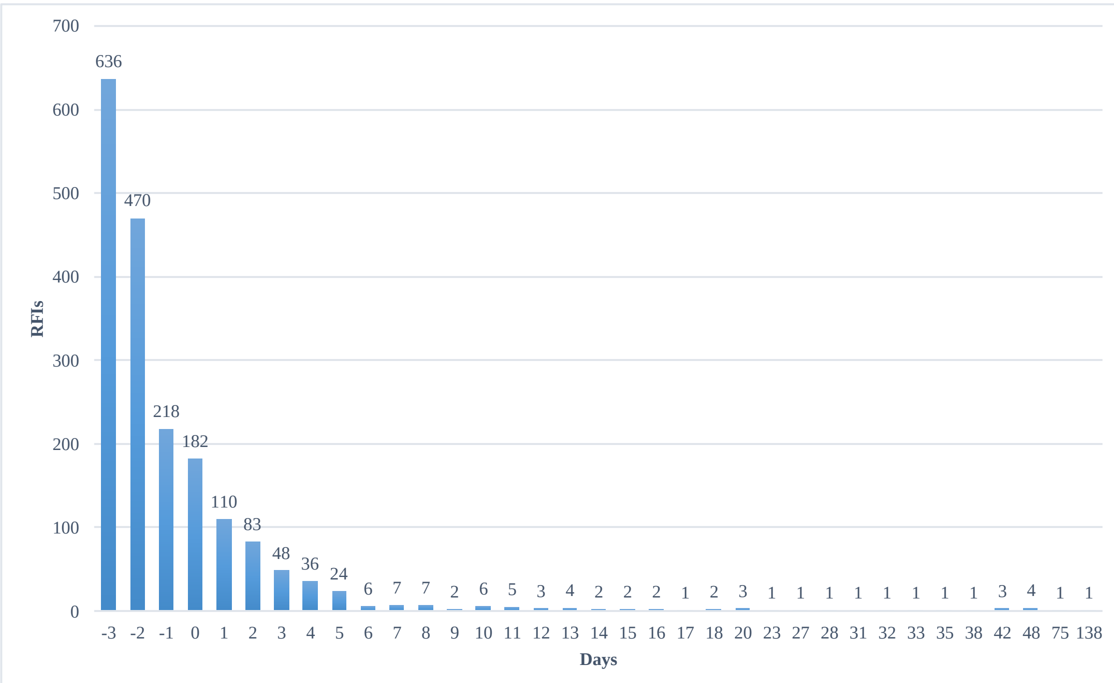

Figure 2. Response time of the RFIs by engineer.

4.5 Documentation Quality

Besides the above mentioned analyses, it is worth to know how good the project documentation that was given to the contractor before the project began. Number of RFIs issued by the contractor could be influenced by the quality of the project documents given to the contractor (Tilley *et al.* 1997). By using Eq. 4, the Documentation Quality Indicator (PI_1) can be calculated. It was found that PI_1 of this project was 0.008. Based on a graphic provided in Tilley *et al.* (1997), the PI_1 = 0.008 can be plotted to the graphic and found that the documentation quality could be considered as an 'Excellent' one. It means that the products of the engineer in designing the four buildings were categorized as excellent; imperfect documents were merely found by the contractor.

5 CONCLUSION

The contractor's claim on the cause of delays of the project due to late response of the engineer's side in processing the contractor's RFI was not verified; the response performance indicator was good, the work-in-process indicator was still far below the engineer's capacity, the on-time-rate indicator was also good, and lastly the documentation quality was considered excellent. Those analyses have shown the problem faced by the project was not on the engineer's side. On the other hand, the ability of the contractor in managing the project documentation was questionable.

As also shown in the analysis, if the project were delayed because of RFIs as the contractor claimed, then the causes would be late approval of work permits due to unprepared site for the work and low capabilities in preparing shop drawings for construction. Improvement of contractor's personnel for site supervision as well as the technical personnel for preparing drawings would be the solution for that. The contractor's capability in managing the subcontractors to comply with the demanding engineer's requirements would also be the cause of the delays. Therefore, the coordination with the subcontractors should be improved.

The authors believe that the root cause for the problem in this project would be poor communication between the engineer's and the contractor's personnel due to different culture and language. Introducing a Japanese-Indonesian interpreter as well as personnel in the engineer's side who are able to speak Indonesian would help the project since the use of English as the bridging language seemed to be not effective.

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