

1 **Undesired Contractual Behaviour of Key Participants in**
2 **Civil Engineering projects**

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12 **Abstract.** The most important key participants in a construction project are the
13 integration between different entities comprising clients, the multidisciplinary
14 consultants (architect, engineers, surveyors) and the contractors. Thus, the
15 contract is needed to protect the contracting parties against opportunistic
16 behaviour and other risks in business relations besides to govern the project
17 implementation in achieving the project goals. Unfortunately, literature has
18 replete with the problems rendered in construction projects caused by the
19 behaviour of key participants who do not duly adhere to the contract in the project
20 implementation. Therefore, this paper aims to identify the common undesired
21 contractual behaviours of key participants in civil engineering projects which
22 largely reported as one of the major factors affecting the project performance.
23 288 feedbacks received out of 700 questionnaires distributed to the G7 CIDB
24 registered contractors and professional engineers registered under the Board of
25 Engineers Malaysia. Descriptive analysis and Mann-Whitney U test were used in
26 data analysis. The findings revealed that among the seven (7) undesired
27 contractual behaviours investigated in this study, the delay in making payment
28 was ranked as the highest occurrence followed by the delay in work progress,
29 delay in issuing drawings and information and delay in site possession. Poor
30 communication and unauthorised instruction were considered as moderate while
31 client direct instruction was a very low occurrence in civil engineering projects.
32 In the attempt to observe the performance of civil engineering projects in
33 Malaysia, the four high occurrence contractual behaviours are critical to be put
34 more concern.
35

36 **Keywords:** Civil Engineering, Contractual Behavior, Contract, Project
37 Performance.

38 1 Introduction

39 Civil engineering projects are unique. Their natures are very different to that of general
40 building construction where mostly they have to be designed for some specific purposes
41 and specific location before they can be constructed and put into use. This makes, civil
42 engineering projects are the projects that mainly full of uncertainty and most of the time
43 quite complex, difficult to manage and replete with undesired behaviour of project key
44 participants. Although, the standard form of contract used for a civil engineering project
45 provides a consensus as to allocating risks and responsibilities of every key participants
46 of the project, unfortunately, literature are still replete with the behaviour of them who
47 fail to duly obey it [1] where eventually reduce the project success. This shows that the
48 problems rendered in construction projects caused by the behaviour of key participants
49 who do not duly adhere to the contract in the project implementation. Thus, in this
50 study, the term ‘contractual behaviours of key participants’ is referring to an action or
51 a conduct of a key participant towards other key participants of the project based on
52 what are stipulated in the agreed contract. In other words, the contractual behaviours of
53 project key participants is referred to what extent the contract is implemented by the
54 people who make decision by the contract.

55 One of the common undesired contractual behaviour of key participants that
56 rendered in construction industry is that the delay in interim payment made by the
57 client. The delay in making interim payment to the contract will cause big impact to the
58 project implementation and eventually lead to the project failure. In fact in Malaysian
59 context, the delay in making interim payment was ranked as first in client related cause
60 of project delay [2]. On the other hand, the weaknesses of payment by the client in
61 terms of the payment amount which is less that the actual workdone also become a
62 factor that lead to disputes between the project participants.

63 Besides, Chini and Valdez [3] stated that the undesired contractual behaviour of the
64 architect also will reduce the project success such as delays, cost overruns, variation
65 and disputes indirectly shown that the failure of the architect to accordingly follow the
66 standard form contract will cause poor building project performance. On top of that,
67 the failure of the contractor to comply with the standard construction method and failure
68 to comply with the approved work program [4] are among the factors caused by
69 contractor that contribute to the project failure. In general building project study, other
70 undesired contractual behaviour of participants of project such as direct instruction by
71 the client to the contractor [5]; late in certifying certifications [6]; and communication
72 skill of contractors [7] also among important undesired contractual behaviour that
73 contribute to the project failure. Regrettably, the study on the contractual behaviour of
74 key participants of civil engineering projects are very limited. This provides impetus to
75 study and explore the occurrence of the aforementioned undesired contractual
76 behaviour in civil engineering projects. In this study, the undesired contractual
77 behaviour of key participants’ variables used were “delay in payment”, “delay in work
78 progress”, “delay in issuing drawing and information”, “delay in site possession”, “poor
79 communication”, “unauthorised instruction” and “client direct instruction”.

80 2 Research Methodology

81 This study adopted a quantitative approach using questionnaire survey where the
 82 process started with an intensive literature review to identify the project performance
 83 criteria to be used in this study, the common undesired contractual behaviours of key
 84 participants which have the possibility in affecting the project performance. It is found
 85 that seven contractual behaviours of key participants i.e “delay in payment”, “delay in
 86 work progress”, “delay in issuing drawing and information”, “delay in site possession”,
 87 “poor communication”, “unauthorised instruction” and “client direct instruction”.

88 Next, to ensure the validity of variables gained from literature reviews, preliminary
 89 questionnaire survey was piloted to G7 contractors and consultant engineers. This phase
 90 has formed the foundation for subsequent phase and assisted in the design of the main
 91 survey. 12 responses gained by the cut-off date given and then the Reliability Test using
 92 Cronbach’s alpha coefficient test was performed and the value of the test was 0.739,
 93 which was more than 0.7. This indicates that the 5-point Likert scale measurement was
 94 reliable, and the main questionnaire survey could be carried out to all respondents. The
 95 5-point Likert scale used to determine the common undesired contractual behaviour of
 96 key participants in civil engineering projects with values on the scale was as follows: 1
 97 as “very low”, 2 as “low”, 3 as “moderate”, 4 as “high” and 5 as “very high”. Hence,
 98 factors with mean values between 4 and 5 were considered as having very high
 99 occurrence on contractual behaviour of key participants in civil engineering projects.

100 Out of 700 numbers of questionnaire sent out, only 288 numbers returned before cut-
 101 off date (deadline) given representing 41% response rate. The data gathered was
 102 analysed using statistical software SPSS version 21. Descriptive analysis and Mann-
 103 Whitney U test were used to analysed the data.

104 3 Results

105 In terms of respondent profile, the respondents of this study consist of 52% contractors
 106 and 48% consultants (see Table 1) with 100% of their position at their respective
 107 organisations are at executive level (see Table 2). Furthermore, the respondents’
 108 working experience in road projects were 40% more than 10 years’ experience, 52%
 109 have experience between 5 to 10 years and only 8% have experience between 1 to 5
 110 years (see Table 3). These indicate that the respondents of this study were capable and
 111 competent enough to participate in this study.

112 **Table 1.** Respondents' organization

Respondent's organisation	Percentage (%)
Contractor	48
Engineer	52

113

Table 2. Respondents' position

Respondents position in their organisation	Engineer		Contractor	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Manager	17	12%	19	12.60%
Civil Engineer	120	88%	20	13%
Quantity Surveyor	0	0%	112	74.20%
Total	137	100%	151	100%

114

Table 3. Respondents' working experience

Respondent's experience in road projects	Percentage (%)
2-5 years	8
5-10 years	46
more than 10 years	46

115 The objective of this study was to identify the common contractual behavior of key
 116 participants in civil engineering projects particularly from the perspective of contractor
 117 and engineer (representing the client and as the consultant team leader). This was
 118 achieved by determining the frequency of occurrence of contractual behavior of key
 119 participants in the respondents' most civil engineering projects. The common undesired
 120 contractual behavior of key participants in civil engineering project rated by all
 121 respondents were tabulated in Table 4. Meanwhile in Table 5, the comparison of
 122 undesired contractual behavior of key participants rank rated by both contractor and
 123 engineer respondents.

124 **Table 4.** undesired contractual behavior of key participants in civil engineering projects rated
 125 by all respondents

Undesired contractual behaviour of key participants	N	Mean	Standard Deviation	Rank
Delay in payment	288	4.04	0.247	1
Delay in work progress	288	3.78	0.441	2
Delay in issuing drawing and information	288	3.42	0.495	3
Delay in site possession	288	3.42	0.494	4
Poor communication	288	3.37	0.483	5
Unauthorised instruction	288	3.27	0.443	6
Client direct instruction	288	1.84	0.903	7

126
127**Table 5.** Undesired contractual behavior of key participants in civil engineering projects based on contractor and engineer perception

Contractual behaviour of key participants	Overall			Engineer			Contractor			Mann-Whitney U
	N	Mean	Rank	N	Mean	Rank	N	Mean	Rank	Sig./p
Delay in payment	288	4.04	1	137	4.01	1	151	4.07	1	0.025
Delay in work progress	288	3.78	2	137	3.89	2	151	3.68	2	0.000*
Delay in issuing drawing and information	288	3.42	3	137	3.34	3	151	3.5	4	0.006*
Delay in site possession	288	3.42	4	137	3.17	5	151	3.66	3	0.000*
Poor communication	288	3.37	5	137	3.34	4	151	3.4	5	0.280
Unauthorised instruction	288	3.27	6	137	3.17	6	151	3.36	6	0.000*
Client direct instruction	288	1.84	7	137	1.68	7	151	1.99	7	0.004*

128 **4 Discussion**

129 Following the interpretation of the 5-point Likert scale, the analysis of the survey data
130 indicated that out of the mean scores for the seven contractual behaviour of key
131 participants rated by overall respondents, only “delay in payment” seen to have very
132 high occurrence in civil engineering projects with mean value of 4.04. For moderate
133 occurrence of contractual behaviour of key participants, “delay in work progress” by
134 contractor (M = 3.78) was ranked as the second-high occurrence, followed by “delay
135 in issuing drawing and information” (M = 3.42), “delay in site possession” (M = 3.42),
136 “poor communication” between engineer and contractor (M = 3.37) and “unauthorised
137 instruction” (M = 3.27). Meanwhile, with the mean value of 1.84, the “client direct
138 instruction” seen to have low occurrence in civil engineering projects. However, by
139 referring to Table 5, there was slightly difference opinion between engineer and
140 contractor on the rank order of contractual behaviour of key participants with sig. p-
141 values less than 0.05 (marked with asterisk). The significance of difference of the rank
142 was tested using Mann-Whitney U test.

143 Both contractor and engineer opinion showed that “delay in payment” was the most
144 frequent undesired contractual behavior of key participants occur in civil engineering
145 projects with Mean value 4.07 and 4.01 respectively. This finding supports the literature
146 that “delay in making payment” has given severe impacts on the project performance
147 [2; 8]. With the cut off mean value of 3.50, both contractor and engineer admitted that
148 “delay in work progress” was moderate-to high occurrence in civil engineering projects.
149 This finding also in line with Alaghbari et al. [1], Sambasivan and Soon [2], Jaffar et

150 al. [4], Cheung et al. [9] and Lo et al. [10] who claimed that delay in work progress by
 151 contractor mainly lead to construction time overruns. On top of that, the “delay in
 152 issuing drawing and information” as well as “delay in site possession” also perceived
 153 by contractor as the moderate-to high occurrence of undesired contractual behavior of
 154 key participants in their most civil engineering projects. “poor communication” and
 155 “unauthorised instruction” were considered as moderate occurrence in this study with
 156 Mean value ranged between 3.17 to 3.40. Meanwhile, the result showed that the “client
 157 direct instruction” was very low occurrence in civil engineering projects with Mean
 158 value of 1.68 and 1.99 rated by engineer and contractor respectively.

159 **5 Conclusions**

160 Civil engineering projects in Malaysia mostly associated with severe cost and time
 161 overruns with unsatisfactory quality. Due to its important to national development and
 162 economic activities a mitigating action must be put into civil engineering projects to
 163 ensure the future projects can be delivered satisfactorily as required. The outcome of
 164 this study contribute by identifying the undesired contractual behaviours of key
 165 participants affecting the previous civil engineering projects’ performance. The “delay
 166 in making payment” towards contractor was perceived to have highly occurrence in
 167 civil engineering projects and might all this while highly cause their poor project
 168 performance. Thus this undesired contractual behavior must be put more concern. Other
 169 than that, “delay in work progress”, “delay in issuing drawings and information” and
 170 “delay in site possession” also have potential to affect project performance. Therefore,
 171 these four undesired contractual behaviours of key participants in civil engineering
 172 projects need to be given more attention by the government and project participants to
 173 ensure we can deliver project satisfactorily.

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