

A case study on the role of the Engineer to manage delay and disruption events in the Bagratashen bridge according to FIDIC Yellow book 1999



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Introduction

Contract management is the process of facilitating both parties to a contract to fulfill their obligations towards the delivery of the final objects agreed in the contract. This report introduces the Engineer's role and activities in identifying the significant cause affecting the delayed works and 3rd party's disruption based on FIDIC Yellow (1999) regarding the construction of the Bagratashen bridge at the Sadaklo~Bagratashen border crossing between the Republic of Armenia and Georgia financed by EBRD (European Bank of Reconstruction and Development).



Fig 1. Border crossing between Armenia and Georgia

1. Project location and contract basis

1.1. Contractor's design liability

The project was procured on a design and build basis,

the contractor takes design liability in a contract negotiation or tender stage, and decisions on pricing strategies for constructing the bridge are based on the contractor's experience, understanding of the contract condition, and risks of the project site. The Engineer intervened in the contractor's design to fulfill 'to be fit for purpose according to the Employer's requirements to avoid the down-scale design.

Transboundary provisions by Intergovernmental joint committee.

The project location is at the border of two countries (Armenia and Georgia); the special regime suggested constructing a bridge in the contract document. There are relevant authorities such as the customs office and border police that are active in 3rd Parties' disruption to cause the delay events on the project schedule in the project in completing the contractor's design and implementation. Border police and customs authorities of Armenia and Georgia are responsible for arranging simplified crossing points and staffing to realize a special regime, issuing corresponding pass certificates for contractors' work.

1.2. Project period

The contract schedule is divided into Section I (Design stage) and Section II (Implementation stage), considering

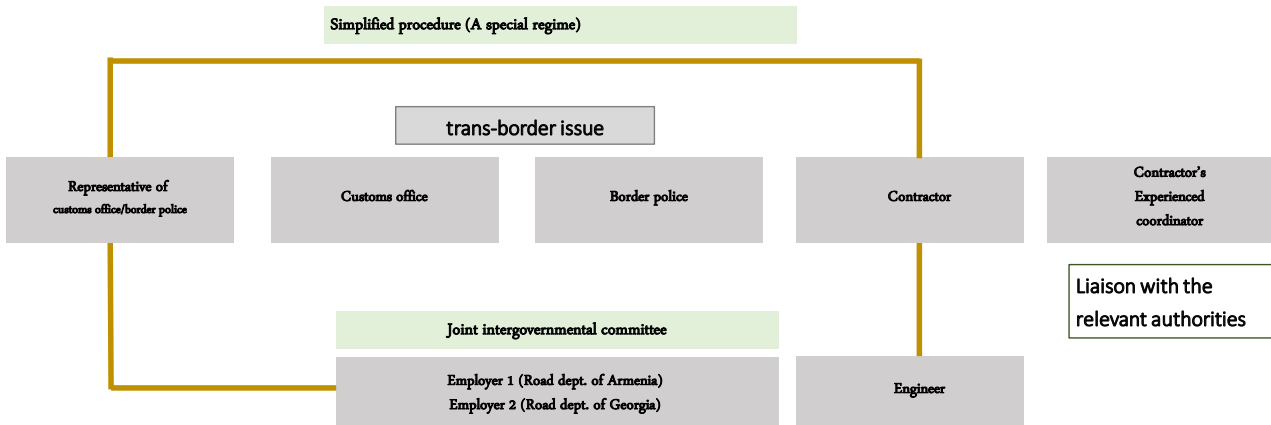
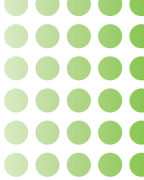


Fig 1. Simplified procedure

Contract period																				
List	Design (Section I)						Approval period	Implementation (Section II)											Defects Liability	
	D1 / Month																		D2 / 2year	
Contract period	1	2	3	4	5	6	4 weeks	7	8	9	10	11	12	13	14	15	16	17	18	2 Months
	6 months							12 months												

Detailed design relocating the utilities	design approval	Permanent works of building a bridge
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Fig 2. Original contract period

the design-build project. The contractor will complete the detailed design and submit the final design to the Engineer and State expertise to get approval for finalizing the design.

2. Risk mitigation for finalizing the design and completing the permanent work.

The contractor's proposal document in the tender stage was considered the preliminary design when the contractor awarded it. The contractor's eligibility and experience in drafting the preliminary design is the key factor in mitigating the high risk of completing the detailed design. Conflict and dispute often arise because the contractor perceived a lack of fairness in the contract interpretation due to misunderstanding the site condition. In this case, many disputes come from what is named 'claim man-ship, which involves a 'claim game' by the contractor.

2.1. Contractor's claim for the delayed work (Section I /Design stage)

The contractor drafted the delay protocol for the claim during Section I, which was an application for additional payment and a request for an extension of the time for completion due to the delayed twenty-three months. The original schedule for completing the detailed design was May 2019; however, the Engineer issued the commencement date of the work as May 2021. Twenty-three months are delayed for finalizing the detailed design.

The contractor's delay and disruption claims are justified and evaluated without analyzing the productivity loss by the Engineer as such;

Selected ways of assessing delays include an overview of the facts and comparing actual and planned progress (as-planned vs. as-built). The Engineer should preferably analyze the delay as they occur, considering the actual critical paths; still, it is high complexity to

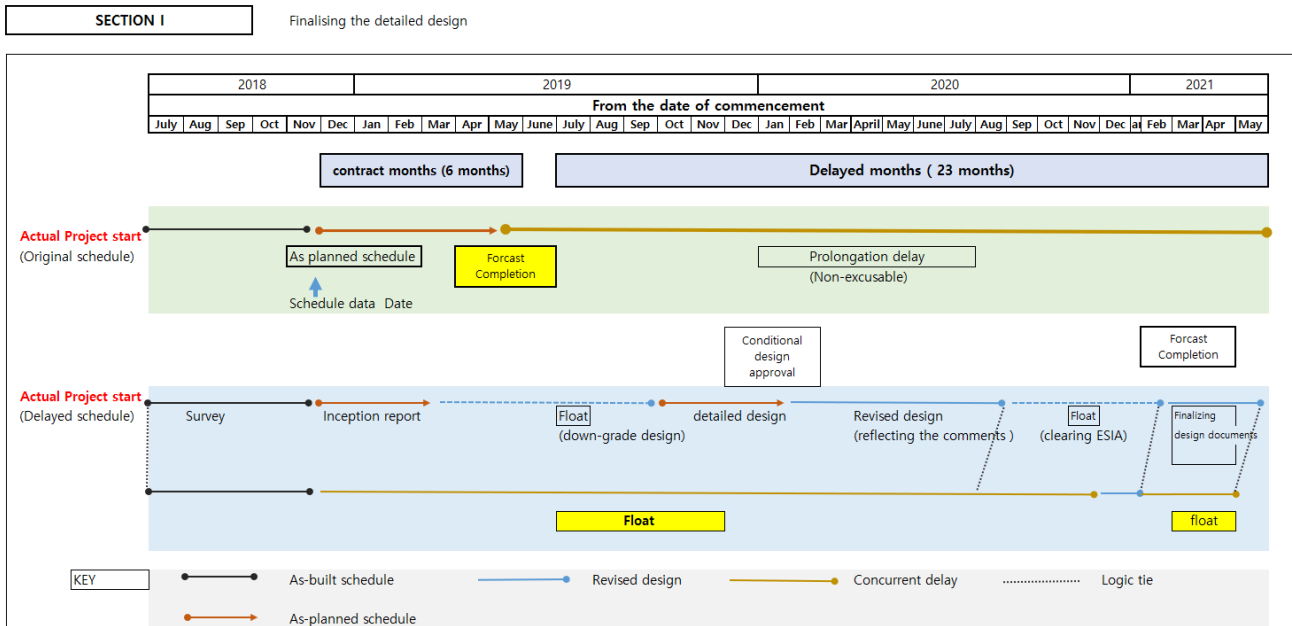


Fig 3. Finalizing the contractor's detailed design

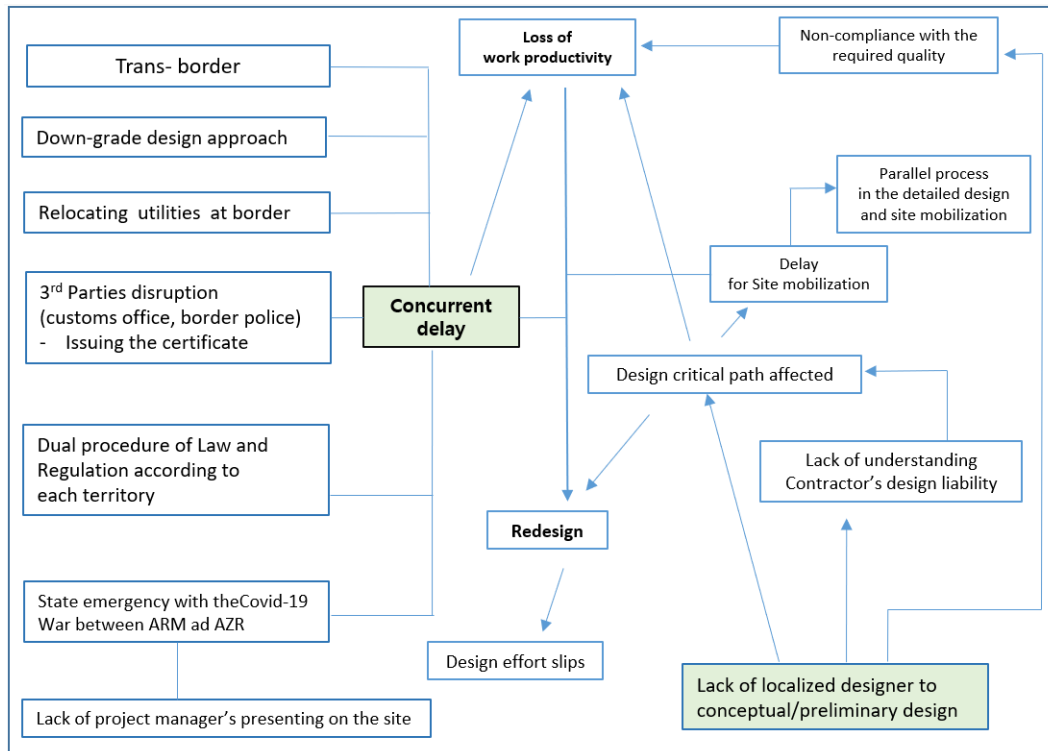


Fig 4. Diagram of the concurrent delay

define the 3rd party's involvement in causing the delay in completing the design. Most delay events are combined with structural stability issues (risk-based design), EIA reports, and 3rd parties' disruption; this connection leads

to the concurrent delay (parallel delay) in Section I. In particular, the contract document is based on FIDIC forms of the contract containing provisions dealing with conflict between the Employer's Requirements and the

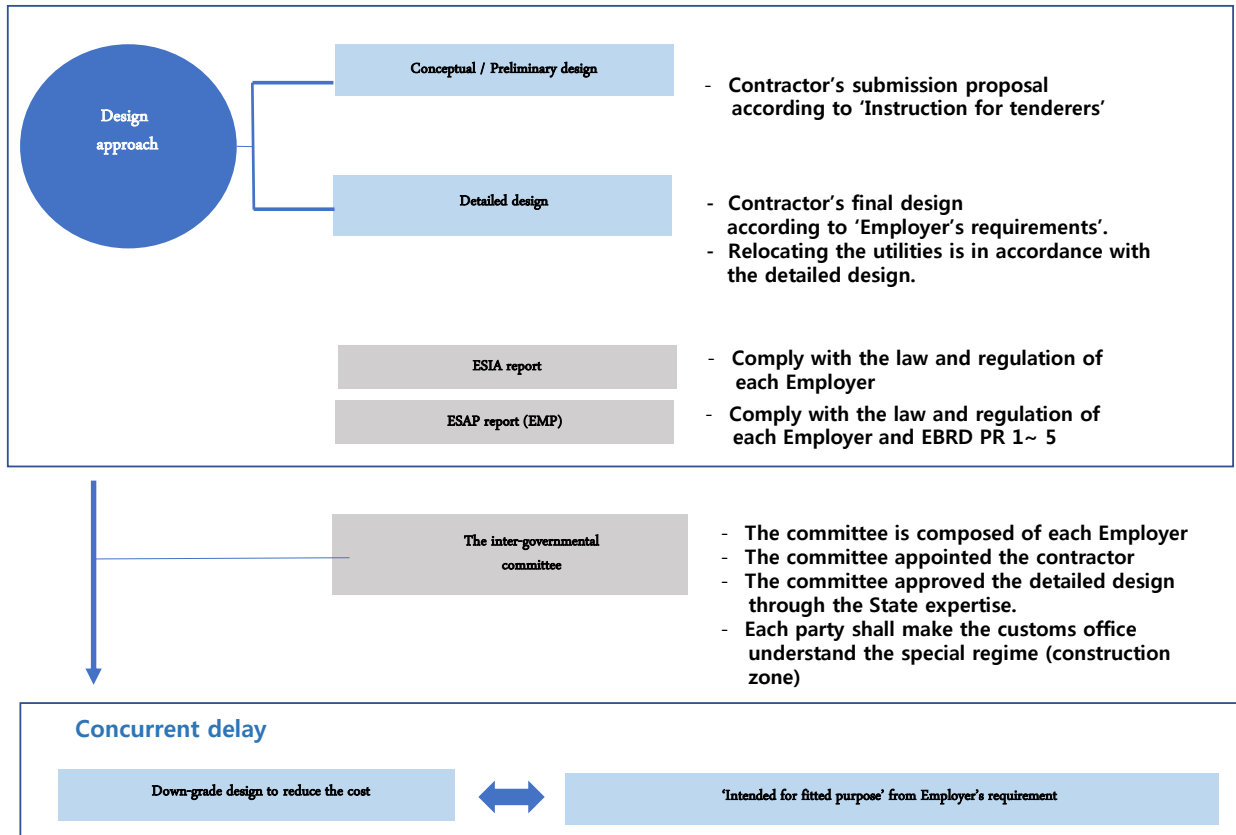


Fig 5. Concurrent delay in line with the Employer's requirements

contractor's design proposal. Still, the contractor is obliged within the agreed Accepted amount to design-build that is everything shown in the Employer's Requirements and can carry out further design work as necessary to develop the specific requirements. Based on FIDIC Yellow (1999), the contractor proposed the bridge plan and design with the selected materials that are favorable for taking the contractor's experiences to secure the quality. Unfortunately, the down-scale design was adapted to reduce the construction cost by the contractor. Especially the ESIA report took different approaches. It did not look consistent with the Employer's requirements and EBRD policy in the preliminary stage. In addition, the design team had misunderstood the law and regulations of the two countries in the initial stage of the design, so it was required many times to revise the report of ESIA, which caused a delay attributable to the contractor.

2.2. Contractor's claim for extension of time for completion (Section II /Implementation stage)

The contractor's claim was transboundary on two countries, procurement issues due to the war (Russia – Ukraine), unexpected weather conditions, and covid-19, etc., including the delayed payment, lack of coordination for passing the border, and additional work items, etc.

Unplanned delays on the project happened but were unavoidable. TIA (Time impact analysis, hereafter 'TIA') is a simplified analytical procedure typically specified on the project to facilitate the award of excusable days to project completion due to delays that were not the contractor's responsibility.

The Engineer reviewed TIA while the project was ongoing, which has a 'forward-looking' or a 'prospective analysis' perspective in near-real time. The contractor did not prepare the contemporary record for the analysis, overlooking the Engineer's request to submit them. The

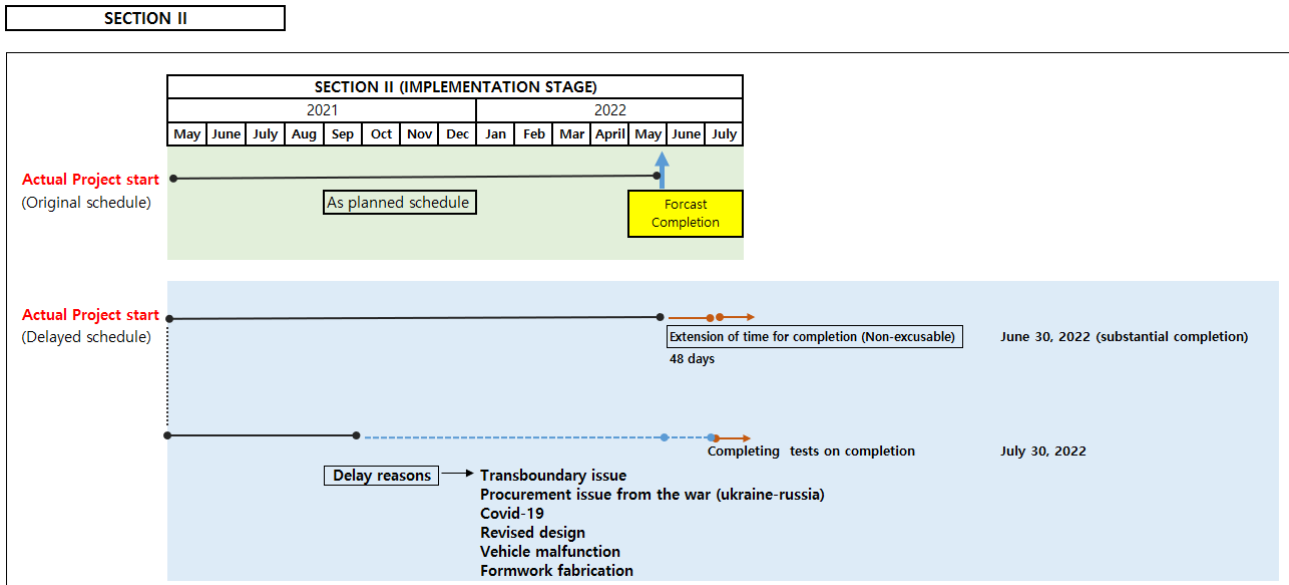


Fig 6. Finalizing the bridge construction

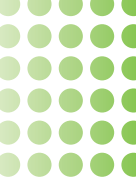
retroactive forensic research for the delayed analysis was not desired without the daily/weekly working schedule as well as an incorrectly updated schedule (program), so the contractor's schedule update does not reflect actual

conditions at the time of the delay in this connection. Consequently, TIA is not viable to verify the cause/effect approach that the substantial delay would not result in a change in the work plan.

Table 1. Managing the contract issues including the claims

Items	Events	Engineer's activities
Concurrent delay with Section I		
Design approval	Delayed approval by the Engineer	Request for taking risk-based design
Finalize the detailed design	Issuing the commencement date of Section II	Contractor's EOT entitlement
Suspending the Works (Letters)	Engineer's disruption to the design (Selected foundation types)	Structural stability issue
	Engineer's disruption to the design works	Structural stability issue
	Delayed payments by the Employers	Employer's explanation
	Engineer fails to issue the certificate of IPC	Objection to the supplementary data
Contract document discrepancy	No actual body for fulfilling the Contractor's obligation	Amicable settlement between parties
Site possession	3rd Parties' disruption (Border/customs office)	No data for the productive loss
Employer's uncertainty	Directed by the Employer	No data for clarifying cause/effect
Changes in legislation	Scoping report for ESIA	Contractor's different approach
Extension of time for completion with Section II		
Force majeure	Unfavorable bad weather	Not an exceptional way
	Russia-Ukraine war	Not an exceptional way
	Covid-19	No data for the productive loss
	Armenia-Azerbaijan war	Employer's office is working as usual
	Inflation	No data for the productive loss
Design modification	Contractor's obligation	Instructed by the Engineer
Tests on completion	Delayed tests on completion	Instructed by the Engineer

Note 1. The contractor's EOT entitlement without compensation does not impact the additional cost with 'Not an exceptional way'.



3. Engineer's activities

The Engineer did not accept the contractor's delay claims for the independent delay and the concurrent delay adopted for the prolongation delay of finalizing the detailed design (Section I).

3.1. Concurrent delay with finalizing the detailed design (Section I)

The Engineer evaluated the delay as a concurrent delay after clarifying the contractor's right to obtain time-related compensation in line with the contractor's baseline. In particular, the contractor's claim for 3rd parties' disruption has not been accepted by the Engineer considering its delays on overlaps due to repeatedly revised design and late delivery from the contractor. The contractor's eligible and experienced staff must recognize the risk relating to the site condition during the tender stage regarding the possible independent delay, serial delay, and concurrent delay, as well as identifying the special regime (Trans-boundary issue at the border) with the organizing of the joint government committee according to the contract document. Concurrent delays happened in the design stages, and site mobilization had done in part. In the design-build project, the risk of the contractor's design products was not against the code compatibility, and following up on the comments on the State expertise by both Employers and the Engineer has interfered with the contractor's design to clear the problematic issues of the detailed design with all unexpected conditions.

3.2. Engineer's determination for extension of time for completion (non-excusable/Section II)

An initial analysis of the effects of the delay events described in the contractor's documents (delay protocol) was submitted according to many contractors' letters. At that time, several delayed events were unsolved and previous submissions were prepared on the basis that they would be updated once another delayed event came

whether the full effects of the delay were established or not.

The situation was that the delay issue on both parties (Employer and Contractor) has been resolved with a mutual agreement (amicable settlement) finally. The contractor's entitlement to an extension of time, and thereby relief from any liability for delay damages arising from the contract document, and the contractor did not prove the quantum resulting from cause/effect analysis according to the contemporary records. Based on the above, the Engineer issued the 'Determination' to award 48days to the contractor to complete the work without compensation. Consequently, the contractor is not able to ask the Employer to have an Extension of time with an excusable, the contractor is entitled to ask the Employer to have an Extension of time without excusable.

3.3. Regarding the reduction of the actual delay vs. the entitled extension of time

Constructive acceleration occurs where there is no direct order to accelerate from the Engineer, but the circumstances come to the contractor to expedite the work. The Engineer had not only failed to award an extension of time for completion but also insisted that the contractor must complete by the revised completion date. Notwithstanding the above, the contractor must have employed its best efforts to reduce the effects of delay on the completion date and, following consultation with the Engineer, have adopted acceleration measures. The accelerated measures would have resulted in additional costs and a reduction of the actual delay vs. the entitled extension of time. The contractor did not take any action to reduce the additional cost, and delay protocols did not enough show the contemporary record; it is not able to accept the contractor's delay claims as excusable by the Engineer.

The fact that the Employer's risk events were not prevented the contractor from completing earlier than the contractual completion date and thereby took away the float should not be regarded as giving rise to an

Table 2. Contractor's submission

Contractor's documents for delay protocol

Items	Contractor's submission	Remark
Chronology	Submitted	
Cause and effect	Not submitted	
Updated programme	Submitted	No impact on the delay

Contractor's entitlement for extension of time for completion

Items	Contractor's submission	Remark
Summary of Delay driven completion dates	Submitted	
Mitigation measure adopted	Not submitted	Regarding the claims
Constructive acceleration measures adopted	Not submitted	Regarding the claims

extension. The Engineer pointed the thing that the contractor should take Float (slack) for the schedule as a possible risk to the work, including the procurement and unexpected events during the work.

The contract document shows the imposition of Penalties by the Employer. The delayed damage as the Employer's claim was issued. The Employer takes milestone completion dates only without paying more dates to the contractor into consideration. But the contractor has reasons for asking the Employer to award more days regardless of being the dates are not achieved. The employer's intention to impose the delay damage on the contractor can't be in effect without providing more days

to the contractor in advance.

4. Opinion on the role of the Engineer in accordance with FIDIC Yellow

The FIDIC Yellow enables and regulates the performance of building a bagratashen bridge based on the fact,

4.1. Engineer's design review and design approval

In FIDIC Yellow, the contractor takes the design liability. In many cases, the Employer requested the Engineer to issue PLI (Professional Liability insurance) while the contractor issued the insurance of CAR (contractor's all

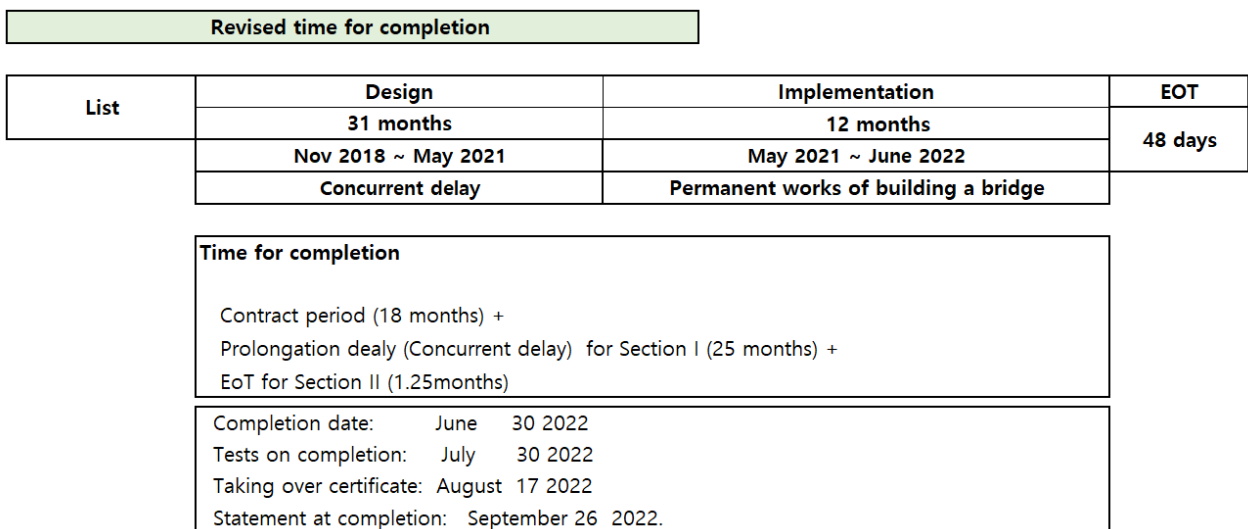
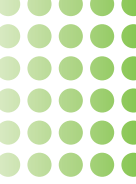


Fig 7. Revised time for completion



risk) as usual. The FIDIC Yellow does not identify the detailed issue of the contractor's design liability under SC 5.2 (contractor's design obligation) where the Engineer intervened in the contractor's design that would cause the delay or protect the down-scale design approach. Especially, the contractor, without operating the design team, will outsource the detailed design to other consultants, which causes serious disruption to meet 'Fit for purpose' in accordance with the Employer's requirements.

The Engineer's reviewing documents before issuing the approval for the construction to the contractor is the other issue like a practical guide to the FIDIC Yellow book (Mr. Brian Totterdill) 'The potential problem from the review procedure is that the Engineer has the power to ask for the resubmission of documents and to delay the construction until he is satisfied. While the Engineer can only object that the document fails to comply with the contract, most design is a subjective process, subject to the preference of the designer. The contractor is ultimately responsible for the performance of his design, and the Engineer must not try to impose his own design preference on the contractor's design.'

In this project, the contractor did not operate the design team in the organization, and the contractor's design has been conducted by an outsourced consultant. In other words, the contractor tried to take the 'down-scaled' design to save the cost, which caused many arguments to the Engineer to complete the design work as a sole design responsibility. The contractor takes responsibility for design and construction while complying with the Employer's requirements, including aesthetic and functional quality, budget, and schedule for timely completion. The Engineer can focus on the scope/needs definition and timely decision-making following the Employer's requirement, rather than on coordination between designer and contractor.

4.2. Employer's requirements

The Employer provides 'Employer's Requirements' to the contractor. The contractor must review the Employer's Requirements and give notice of any error, default, or defect to the Engineer prior to the beginning of the design. In other words, the contractor must study the Employer's requirements during the tender stage, and verify the potential risks imposed on the contractor in order not to cause a delay attributable to the contractor. Anyway, mitigating risks to the contractor where the contractor cannot control these risks will not be beneficial for the successful completion of the project without issuing the Letter of contractor's out of scope, etc.

FIDIC Yellow book that the Engineer comments where the contractor's design is given reason to consider that it will be inadequate. However, it is highly difficult to verify the term 'Inadequate' when it comes to 'down-scale design'. In this project, the risk of operating the design team for the contractor is the key. The Engineer's involvement in the contractor's design is essential when the contractor has tried to modify the description of the Employer's requirements or different interpretations of the design code that cause failure to comply with the contract.