Variation order time impact in unconventional contracts

Intro

Milestones in construction projects typically represent the achievement of a significant event and/or certain stage of work. However, there are rare instances when these milestones prescribe an achievement of payment, by reference to fixed percentages of the contract within a prescribed duration. The completion of such a milestone would not be activity-dependent, but rather cost-dependent.

Variation orders typically address the issue related to additional works and/or descoping works, which potentially have time and/or cost implications on the sequence of the works, completion dates, and contract price. Based on the above, this raises the question on how to address the variation order when conventional delay analysis methodologies cannot be implemented in unconventional contracts,[1] milestones are cost dependent.

Conventional milestones are completely dependent on the sequence of the relevant works. Any critical impact on the sequence would adversely affect the milestone's forecast date, as concluded in conventional delay analysis methodologies. However, when it comes to contract-price-based milestone, it is a different game.

Let us assume the parties enter into an agreement, where the contractor will undertake to complete the works within a period of 50 months for the contract price of USD 10 million. The contract includes four (4) milestones, which are determined by completion of a percentage of the contract price, and within a fixed duration, as shown below:

Milestone no.	Percentage complete	Duration (in months)
I	20%	10
II	50%	25
III	80%	40
IV	100%	50

[1] Due to the fact that milestones keep varying with time as it is measured based on the achieved work, as opposed to completion of a certain aspect of a project in typical contracts.

At some point between Milestone II and Milestone III, the employer issued a variation order of USD 1 million for additional works.

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Assessment of variation orders

The additional work represents 10% of the contract price, thereby revising the contract price from USD 10 million to USD 11 million. On the basis that the milestones are contract-price based, one scenario would be that the contract duration should likewise be pro-rata extended by 10%: 5 months from a total duration of 50 months to 55 months.

In unconventional contracts,[2] a contractor may potentially argue that, as the contract price is revised, then all contract-price-based milestones will be equally revised due to the introduction of a variation order.[3] However, an employer can easily challenge this rationale, as it is theoretical and does not consider the uneven differences in the milestone weightages.

A reasonable and a common-sense approach is necessary to address a variation order's impact on the milestones. One could argue that measurement of its impact in an unconventional contract is not dependent upon required time, but the price of the additional work. Therefore, the variation order's impact on the milestones is measured in consideration of:

1. Timing of the planned execution of the additional work, to identify which subsequent milestones will be impacted;
2. A simple mathematical relationship between the weightage of the impacted milestones; and
3. The price of the additional work and its percentage in conjunction with the contract price.

Assuming in the following example that the additional work needs to be undertaken in the period between Milestone II and Milestone III. The additional work would only impact Milestone III and Milestone IV, as the previous milestones were already achieved.

The original duration between Milestone II and Milestone IV is 25 months. As the additional work represents 10% of the contract price, therefore the revised duration between the milestones would be increased by 5 months to a revised duration of 30 months.

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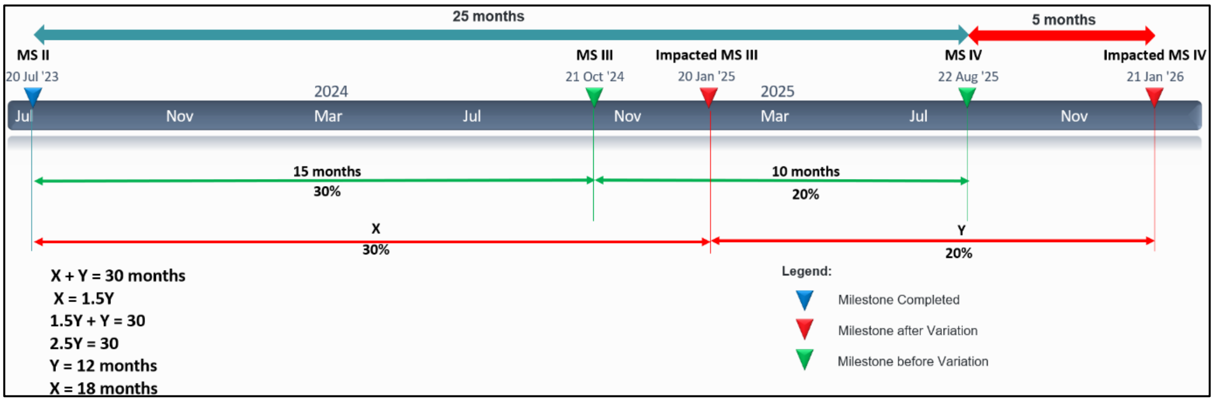
[2] In this article, an unconventional contract is when milestones are contract-price dependent.
[3] A variation may have an additive or subtractive impact on the contract price. For the sake of simplicity, the article addresses in the event a variation order has an additive impact, only, on the contract price.

The figure below illustrates the calculation of the revised Milestone III and Milestone IV durations, following the introduction of the additional work though a variation order.



The durations of the milestones are therefore amended as follows:

Milestone no.	Percentage complete	Duration (in months)
I	20%	10
II	50%	25
III	80%	43
IV	100%	52

Conclusion

In unconventional contracts, the milestones are contract-price dependent and prescribe the achievement of quantities achieved. Therefore, a creative, reasonable, and common-sense approach is necessary to determine the impact of a variation order on the milestones.

In the absence of a resource-loaded programme, a simplistic way of determining the impact is by considering i) the planned timing to execute the additional work, ii) the mathematical weightage relationship between the affected milestones, and iii) the cost of the additional work. Although, effort and progress in construction projects are not linear.

An alternative solution one considers might provide a more reasonable and effective solution is the use of a resource-loaded programme. It is a useful tool to demonstrate the impact of a variation order, as it automatically calculates the exact point in time when the cost-based milestones were achieved. Although time-consuming, the employment of a resource-loaded programme would be essential when entering a contract with contract-price-dependent milestones and allows the usage of conventional delay analysis methodologies to some extent.

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