CONTRACTUAL VARIATIONS IN CIVIL INFRASTRUCTURE: A TECHNO-LEGAL STUDY OF PUBLIC WORKS IN INDIA

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ABSTRACT

Construction contracts in public infrastructure projects frequently encounter variations arising from changes in quantities, design modifications, and unforeseen site conditions. These variations give rise to contractual issues relating to extra items, substituted works, non-BOQ items, and rate determination. NHAI, CPWD, and State Public Works Departments adopt divergent contractual frameworks governing the valuation of such works.

This paper undertakes a comparative analysis of the contractual mechanisms adopted by NHAI, CPWD, and the Andhra Pradesh/Telangana State PWD framework for dealing with variations and extra items. It categorises non-BOQ works into BOQ-derivable, schedule-derivable, and non-schedule items and examines rate fixation methodologies under each framework, including reliance on the Bill of Quantities, Standard Data Books, Schedule of Rates, market analysis, and daywork systems.

The study analyses judicial pronouncements by the Supreme Court and High Courts that emphasise that arbitral and administrative determinations must remain within contractual boundaries. Courts have held that arbitrators cannot disregard express contractual provisions governing rate fixation and that extra-item claims must be supported by contemporaneous measurement records and procedural compliance.

The paper highlights inconsistencies in terminology, classification, and valuation mechanisms across organisations, leading to ambiguity and contractual disputes. It concludes that harmonising contractual terminology and standardising variation mechanisms across public infrastructure contracts is necessary to enhance legal certainty, minimise disputes, and improve efficiency in contract administration.

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1. INTRODUCTION

After the competent authority for a project accords technical sanction, the Bill of Quantities (BOQ) is prepared as part of the bid documents to facilitate uniform bidding and comparative evaluation of bids. The priced and completed BOQ submitted by the bidder forms part of the bid and determines the contract price.

The BOQ sets out the description of items, estimated quantities, and the rates quoted by bidders for the execution of the work in item-rate contracts. In percentage-rate tenders, bidders quote a percentage above the estimated contract value (tender premium) or below the estimated contract value (tender discount).

The BOQ, however, does not freeze the actual quantities required for execution, and variations in quantities during execution do not, by themselves, affect the validity of the contract. Contractors are ordinarily bound to execute such variations within the contractual framework governing the works.

In practice, however, execution of public works and infrastructure contracts rarely proceeds exactly in accordance with the quantities and specifications originally contemplated at the tender stage. Site conditions, design modifications, requirements, changes in methodology, and operational necessities frequently result in excess quantities, substituted items, extra items, omissions, and entirely new items of work. Such variations often give rise to disputes relating to entitlement, valuation, rate fixation, deviation limits, and the scope of authority of the Engineer or departmental officers under the contract.

The legal and contractual principles governing such variations assume importance in construction contract administration, particularly in large public works contracts where disputes concerning extra items and deviations frequently lead to arbitral proceedings and prolonged litigation.

2 TERMINOLOGY

Different contractual frameworks governing public works and infrastructure contracts employ varying expressions for substantially similar concepts relating to variations, deviations, extra items, substituted items, and additional works. The important terms relevant to the present discussion are set out below.

2.1 NHAI Framework

2.1.1 *Bill of Quantities (BOQ)*

The Bill of Quantities means the priced and completed BOQ forming part of the bid and is used for the determination of the Contract Price. The BOQ contains items relating to the construction, installation, testing, commissioning, and maintenance of the works to be executed by the contractor.

In the States of composite Andhra Pradesh and now Telangana, the BOQ forming part of the bid is commonly designated as Schedule 'A'.

2.1.2 *Deviation in Quantities*

Deviation in quantities refers to variation between the quantities provided in the BOQ and the quantities actually executed during the course of performance of the contract.

2.2 CPWD Framework

2.2.1 *Extra Works*

Extra Works refer to entirely new items of work not originally contemplated in the BOQ but required for completion of the project, for which no rate exists in the contract.

2.2.2 *Negative Deviation*

"Negative Deviation" means when total quantity of an item executed is lower than the quantity of the item as stipulated in the contract.[5]

2.2.3 *Substitute Item*

[5] Central Public Works Department, *CPWD Works Manual* (Government of India, Ministry of Housing and Urban Affairs, 2024).

A Substitute Item refers to an item executed in place of an item originally provided in the BOQ, involving a change in specification, material, or method while achieving the same functional requirement.[6]

2.3 Andhra Pradesh & Telangana Framework

2.3.1 *Additional Items of Work*

Additional Items are items found necessary after award of the work, which can be executed independently without affecting or interfering with the execution of the original contract work.[7]

2.3.2 *Supplemental Items of Work*

Supplemental Items are items found necessary after award of the contract, which cannot be executed independently without affecting the original work and are therefore required to be executed along with the original contract.[8]

2.4 General Contractual Concepts (Cross-Framework)

2.4.1 *Variations*

Variations refer to any alteration in quantities, specifications, design, scope, or method of execution of works during the course of contract performance, including additions, omissions, and substitutions as instructed under the contract.

2.4.2 *Schedule of Rates (SOR) / Standard Data Book (SDB)*

The Schedule of Rates (SOR) is a departmental publication prescribing standard rates for common items of work. The Standard Data Book (SDB) provides standard input-based analysis of labour, material, and machinery for the determination of rates for non-scheduled items.

2.4.4 *Variation Order / Change Order*

A written instruction issued during execution directing additions, omissions, or modifications

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[6] Id.

[7] *Andhra Pradesh Public Works Department Code* ¶ 154 (Sri Padala Rama Reddi & Sri Padala Srinivasa Reddy eds., Asia Law House rev. ed.), 2020, Asia Law House, Hyderabad, India.

[8] Id.

to the original scope of work in accordance with the contract conditions.

3 SCOPE OF THE PAPER

This paper examines the contractual and legal principles governing variations in construction contracts, with particular reference to percentage-rate tenders. The discussion is confined to situations where the contract price is determined by applying a percentage above or below the estimated contract value, and where payments are made on the basis of executed quantities measured against BOQ items.

The analysis focuses on variations arising due to deviations in quantities, substituted items, extra items, supplemental items, additional items, and omissions. The paper also examines the principles governing the determination of rates for such items, including reliance on the Schedule of Rates (SOR), Standard Data Book (SDB), market rates, and contractual mechanisms for fixation of rates for non-scheduled items.

The contractual frameworks considered in this paper include those of the National Highways Authority of India (NHAI), the Central Public Works Department (CPWD), and the Public Works Department frameworks of the composite States of Andhra Pradesh and now Telangana. These frameworks have been selected as they represent widely adopted models in public infrastructure procurement and have generated substantial jurisprudence in arbitration and judicial proceedings relating to variations and payment disputes.

The inclusion of the Andhra Pradesh and Telangana PWD frameworks is based on their extensive use in public works administration and the continuity of contractual practices across the pre- and post-bifurcation regimes. These frameworks also reflect detailed codified procedures governing additional items, supplemental items, and deviations, which have significantly influenced dispute resolution in practice.

The NHAI and CPWD frameworks are included for comparative purposes, particularly to highlight differences in contractual structure, variation mechanisms, and rate determination methodologies across central and state-level public works regimes.

The paper is primarily intended to provide a structured understanding of how arbitral tribunals and courts have interpreted contractual provisions relating to variations and related claims, with emphasis on their application in day-to-day contract administration and dispute resolution.

4 Contractual Frameworks Governing Variations and Excess Quantities

Although the underlying objective remains substantially similar, the terminology employed, procedural requirements, thresholds for rate revision, and powers of approval differ across organisations. The relevant contractual frameworks are examined below:

4.1 Procedures Adopted by Organisations for Excess Over BOQ Quantities

The relevant contractual frameworks adopted by NHAI, CPWD, and the Composite Andhra Pradesh State, and now Telangana PWD, are examined below:

4.1.1 *MoRTH–NHAI Standard Bidding Document Framework (NCB Works)*

The Ministry of Road Transport and Highways (MoRTH) provides the Standard Bidding Document (SBD) framework for public works procurement, which is operationalised by agencies such as the National Highways Authority of India (NHAI) in National Competitive Bidding (NCB) for item-rate (percentage) contracts. Under such contracts, the Contract Price is derived by applying a single quoted percentage above or below the Bill of Quantities (BOQ), which forms the basis for payment and valuation.[9]

Provisions relating to changes in BOQ quantities are governed by the General Conditions of Contract forming part of the applicable MoRTH SBD as adopted in the NHAI tender documents. Within this framework, the Engineer is empowered, subject to approval of the Employer, to order variations in quantities having regard to the scope of the work and the BOQ-based Contract Price.

The Engineer may also direct the omission of any BOQ item with the approval of the Employer, and such omission shall not ordinarily entitle the Contractor to compensation unless expressly provided under the Contract.

Where the quantity of any BOQ item varies beyond the threshold specified in the Contract (commonly twenty-five per cent), and such variation exceeds the stipulated percentage of the

[9] Ministry of Road Transport and Highways, *Standard Bidding Document for Road and Bridge Works* (Government of India, latest applicable version); National Highways Authority of India, *General Conditions of Contract for Works Contracts* (MoRTH framework as adopted in NHAI tender documents).

Contract Price, the rate may be subject to adjustment by the Engineer in accordance with the contractual mechanism for rate determination prescribed under the GCC.

4.1.2 *CPWD – General Conditions of Contract / Works Manual Framework*

The Central Public Works Department (CPWD) does not employ the term "Bill of Quantities" and instead adopts the expression "Schedule of Quantities (SOQ)".[10] Excess quantities beyond the Schedule of Quantities are dealt with under the broader concept of "deviations" and are commonly referred to as "deviated quantities".[11]

Concerning excess quantities, the procedure prescribed under Clause 12.2(c) of the General Conditions of Contract is ordinarily followed.[12] The clause provides that where the quantity of a contract item exceeds the limit specified in Schedule F, the contractor may, within fifteen days from the occurrence of such excess or receipt of the relevant order, seek revision of rates by submitting a detailed rate analysis and supporting documents in accordance with Clause 12.2(a) or Clause 12.2(b), as applicable.

Upon receipt of the claim, the Engineer-in-Charge is required to consider the analysis of rates and supporting material and determine the applicable rates within the prescribed period. Where the contractor fails to submit the claim with the required analysis within the stipulated time, the Engineer-in-Charge may determine the rates based on available records, and such determination becomes binding on the contractor.

The CPWD framework further provides that rates derived from the Standard Schedule of Rates shall receive priority in rate analysis.[13]

With respect to Scheduled Extra Items, CPWD adopts separate mechanisms for percentage-rate and item-rate tenders:[14]

(a) In percentage-rate tenders, extra items are ordinarily paid on the basis of the Standard

[10] Central Public Works Department, *General Conditions of Contract for Works* (Government of India, Ministry of Housing and Urban Affairs, 2022, as amended up to date).
[11] Central Public Works Department, *CPWD Works Manual* (Government of India, Ministry of Housing and Urban Affairs, 2024).
[12] Central Public Works Department, *General Conditions of Contract for Works* (Government of India, Ministry of Housing and Urban Affairs, Clause 12.2(c)).
[13] Central Public Works Department, *CPWD Works Manual* (Government of India, Ministry of Housing and Urban Affairs, provisions relating to Standard Schedule of Rates and rate analysis).
[14] Central Public Works Department, *General Conditions of Contract for Works* (Government of India, Ministry of Housing and Urban Affairs, provisions relating to Scheduled Extra Items).

Schedule of Rates specified in Schedule F, adjusted by the applicable cost index and further enhanced or reduced by the percentage quoted by the contractor above or below the estimated cost put to tender.

(b) In item-rate tenders, extra items are generally paid on the basis of the scheduled rates, adjusted by the applicable cost index and proportionately related to the tender amount and estimated cost put to tender.

For each work, Schedule F accompanying the bid documents prescribes limits beyond which revised rates become negotiable under Clause 12.2(a) or Clause 12.2(b),[15] as applicable. In general, the following limits are specified:

(i) Original Works

(a) Superstructure – 30%
(b) Foundations – 100%

(ii) Original Works of a Time-Bound, Urgent, or Emergency Nature

(a) Superstructure – 50%
(b) Foundations – 100%

(iii) Maintenance Works – 50%

Under CPWD contracts, excess quantities are treated as "deviated quantities" governed by the limits specified in Schedule F. The contractor remains bound to execute quantities within such limits at the tendered rates. Entitlement to revision of rates ordinarily arises only when the prescribed deviation limits are exceeded and the contractor submits the requisite rate analysis within the stipulated period.

4.1.2.1 *Power of the Engineer-in-Charge to sanction deviated items*[16]

Where technical sanction for the work has been accorded by the Engineer-in-Charge himself, he may approve deviations, including deviated quantities, provided that the overall expenditure

[15] Central Public Works Department, *CPWD Works Manual* (Government of India, Ministry of Housing and Urban Affairs, Schedule F deviation framework).
[16] Central Public Works Department, *CPWD Works Manual* (Government of India, Ministry of Housing and Urban Affairs, provisions relating to technical sanction, delegated powers, and deviations).

remains within his delegated financial powers and does not exceed the sanctioned Administrative Approval limits applicable to the work.

Where a superior authority has accorded technical sanction, the Engineer-in-Charge may approve deviations within the limits prescribed under the contract and Schedule F, including limited variation in individual SOQ items, subject to the financial powers delegated to him.

In cases where deviations exceed the permissible limits delegated to the Engineer-in-Charge, prior approval of the competent technical sanctioning authority is ordinarily required before execution of such deviations.

4.1.3 *Composite Andhra Pradesh State PWD GCC Framework (Continuing in Telangana State)*

The Composite Andhra Pradesh State Public Works Department framework, which continues to operate in the State of Telangana as the adopted contractual framework, does not employ the term "Bill of Quantities" and instead adopts the expression "Schedule A". P.S 11 of the *Andhra Pradesh Detailed Standard Specifications*[17] (APDSS) expressly provides that the quantities contained in Schedule A are approximate.[18] The relevant P.S is extracted and reproduced below:

P.S. 11. Quantities approximate and contractor to verify the nature and amount of work:— The quantities mentioned in the tender notice and given in the agreement (Schedule A) are worked out from the relevant drawings in Public Works Department Office and may or may not be the actuals required for execution. The Executive Engineer does not expressly or by implication agree that the actual amount of work to be done will correspond therewith but reserves the right to increase or decrease the quantity of any class or portion of the work as he deems necessary, provided there is no change in the scope of the work.

[Amended by G.O.Ms. No. 1007, T, Roads & Builds. (C) Dept., Dt. 5-11-1976]

[17] PADALA RAMA REDDI & PADALA SRINIVASA REDDY, *A.P. Detailed Standard Specifications and General Principles of Engineering Contracts* (16th ed., Asia Law House 2022).

[18] Andhra Pradesh Detailed Standard Specifications (APDSS), P.S. 11, "Quantities approximate and contractor to verify the nature and amount of work", as amended by G.O.Ms. No. 1007, Transport, Roads & Buildings (C) Department, dated 5 Nov. 1976.

P.S. 13 of APDSS further clarifies that the quantities shown in Schedule A are intended primarily to facilitate uniform comparison of tenders.[19]

Unlike the MoRTH and CPWD frameworks, APDSS does not expressly classify variations such as deviations, substituted items, or extra items, but instead adopts a comparatively simplified approach based on additions and omissions. However, such variations are operationally treated as supplemental items under P.S. 63 of the *Andhra Pradesh Detailed Standard Specifications* (APDSS). Clause P.S. 63(a) prescribes the procedure for payment of quantities executed in excess of those specified in Schedule A of the tender:[20]

P.S. 63(a): For all items of work executed in excess of the quantities shown in Schedule A of the tender, the rate payable shall be either the tendered rate or the Standard Schedule of Rates (SSR) for the item, adjusted by the overall tender percentage accepted by the competent authority, whichever is lower.

This provision is intended to safeguard the department against unbalanced bidding practices, whereby contractors may quote disproportionately high rates for early-stage items and lower rates for later-stage items. Significantly, the APDSS does not prescribe any threshold quantity beyond which revised rates become applicable; any quantity executed in excess of the Schedule A provision is governed by P.S. 63(a).

Where the contractor does not accept the rate determined under P.S. 63(a), P.S. 63(d) provides an alternative mechanism.[21] The department may either: (i) engage another agency to execute the additional work, or (ii) direct the contractor, through written orders of the Executive Engineer, to execute the work on a cost-plus basis. Under the latter arrangement, payment is made for the actual cost of labour and materials, together with an additional 10 percent. The contractor is required to submit supporting vouchers within seven days of completion of the work. If the Executive Engineer considers the claimed cost excessive, payment may be determined on a valuation considered fair and reasonable. The Executive Engineer's decision is final where the disputed additional amount does not exceed Rs.1,000 per occasion. For amounts exceeding Rs.1,000, the contractor may invoke arbitration in accordance with Clause

[19] APDSS, P.S. 13.
[20] APDSS, P.S. 63(a).
[21] Id. P.S. 63(d).

73.[22]

4.1.3.1 *Delegation of powers for sanction of deviated items*

Although the APDSS does not prescribe an upper limit for individual items exceeding the Schedule A quantity, approval authority is linked to the overall excess expenditure arising from the additions and omissions relative to the Technical Sanctioned Estimate. The delegation of powers is as follows:

Authority	Permissible Excess over Technical Sanctioned Estimate
Executive Engineer	Up to 5%
Superintending Engineer	Above 5% and up to 10%
Chief Engineer / Engineer-in-Chief	Above 10% and up to 15%

In practice, however, the contractor's final bill (Form LS XXII) classifies all additional work under the broad category of "authorised extras". This classification does not clearly distinguish among:

(1) Excess quantities over original Schedule A items;

(2) Similar items that should be treated as new items but are not intended to replace Schedule A items;

(3) Substitute items, where one specified item is replaced by another (for example, granite flooring substituted for marble flooring); and

(4) Entirely new items not included in Schedule A. For similar and substituted items, rates are generally derived using the Standard Data Book and applicable Standard Schedule of Rates.

Thus, different organisations adopt distinct contractual mechanisms for addressing quantities executed in excess of the Bill of Quantities (BOQ) or other schedule-based provisions. To facilitate a direct comparison of these approaches, an illustrative scenario is developed using a common set of assumptions, including the initial contract price, tender premium, extent of quantity variation, and applicable rate components. For simplicity, the machinery component

[22] Id. P.S. 73.

has been excluded from the rate analysis.

The illustration examines when a revised or new rate becomes applicable under the contractual frameworks of NHAI, CPWD, and the Telangana/APDSS system. By applying identical quantity variations and contract parameters across the three organisations, the analysis highlights the differences in threshold requirements, deviation limits, and rate-determination mechanisms governing excess quantities.

The common assumptions adopted for the illustration are as follows:

(1) Initial Contract Price:	Rs. 10,00,00,000
(2) Tender Premium:	5%
(3) One Percent of Initial Contract Price:	Rs. 10,00,000
(4) Foundation Concrete (Item No.1):	M15 Grade
(a) Agreement Quantity:	200 m^3
(b) Tender Rate:	Rs. 5,000 per m^3
(c) Excess Quantity:	40 m^3 (20%)
(5) Foundation Concrete (Item No. 2):	M15 Grade
(a) Agreement Quantity:	300 m^3
(b) Tender Rate:	Rs. 5,000 per m^3
(c) Excess Quantity:	84 m^3 (28%)
(6) Reinforcement Steel:	Fe 500 Grade
(a) Agreement Quantity:	150 MT
(b) Tender Rate:	Rs. 78,000 per MT
(c) Excess Quantity:	15 MT (10%)
(7) Superstructure Concrete:	M35 Grade
(a) Agreement Quantity:	300 m^3
(b) Tender Rate:	Rs. 8,500 per m^3
(c) Excess Quantity:	120 m3 (40%)

Table 4.1 compares the applicability of revised or new rates under the three contractual regimes and demonstrates that identical quantity variations may lead to different contractual outcomes

depending on the governing conditions for deviations and rate adjustment.

Table 4.1 Comparison of New Rate Applicability for Excess Quantities

S.No.	**Particulars**	**NHAI**	**CPWD**	**Telangana State**
(*1*)	(*2*)	(*3*)	(*4*)	(*5*)
I	Category: Foundation Works			
1	Item No.1(M15 grade Concrete)			
1.1	Quantity as per Agreement: (m^3)	200.00 (As per BOQ)	200.00 (As per SOQ)	200.00 (As per Schedule A)
1.2	Excess quantity (m^3/%)	40.00 (20%) – Within 25% limit	40.00 (20%) – Within Schedule F deviation limits (for foundation items: up to 100%)	40.00 (20%) – Excess beyond Schedule A quantity
1.3	Value of Excess Quantity: Rs. 2,00,000	Rs. 2,00,000 < 1% of the Initial Contract Price.	No monetary threshold is prescribed; applicability is independent of value.	No monetary threshold is prescribed; applicability is independent of value.
1.4	Assessment of the applicability of the new rate	Within threshold limits (both 25% quantity and 1% value conditions not exceeded).	Deviation within Schedule F limits; no justification for new rate	Governed under P.S. 63(a); no predefined quantity or value thresholds
1.5	Does the new rate apply?	No	No	Yes
2	Item No.2 (M15 grade Concrete)			

2.1	Quantity as per Agreement (m3)	300.00 (As per BOQ)	300.00 (As per SOQ)	300.00 (As per Schedule A)
2.2	Excess quantity (m^3/%)	84.00 (28%) – Exceeds 25% limit	84.00 (28%) – Within Schedule F deviation limits	84.00 (28%) – Excess beyond Schedule A quantity
2.3	Value of Excess Quantity: Rs. 4,20,000	Rs. 4,20,000 < 1% of Initial Contract Price	No monetary threshold is prescribed; applicability is	No monetary threshold is prescribed; applicability is
2.4	Assessment of the applicability of the new rate	Exceeds the 25% quantity threshold but does not exceed the 1% Initial Contract Price threshold; revised rate not applicable.	Deviation within Schedule F limits; no justification for new rate	Governed under P.S. 63(a); no predefined quantity or value thresholds
2.5	Does the new rate apply?	No	No	Yes
II	Superstructure			
1	Fabrication and Placing of F_e 500 Grade Steel			

Table 4.1 *(Concluded)*

1.1	Quantity as per Agreement: (MT)	150.00 (As per BOQ)	150.00 (As per SOQ)	150.00 (As per Schedule A)
1.2	Excess quantity (MT/%)	15.00 (10%) – Within 25% limit	15.00 (10%) – Within Schedule F deviation limits (for superstructure items: up to 30%)	15.00 (10%) – Excess beyond Schedule A quantity

1.3	Value of Excess Quantity: Rs. 11,70,000	Rs. 11,70,000 > 1% of Initial Contract Price	No monetary threshold is prescribed; applicability is independent of value.	No monetary threshold prescribed; applicability is independent of value.
1.4	Assessment of the applicability of the new rate	Rate adjustment clause not triggered, as quantity variation does not exceed 25% threshold.	Deviation within Schedule F limits; no justification for new rate	Governed under P.S. 63(a); no predefined quantity or value thresholds
1.5	Does the new rate apply?	No	No	Yes
2	M35 Grade Concrete			
2.1	Quantity as per Agreement (m^3)	300.00 (As per BOQ)	300.00 (As per SOQ)	300.00 (As per Schedule A)
2.2	Excess quantity (m^3/%)	120.00 (40%) – Beyond 25% limit	120.00 (40%) – Beyond Schedule F deviation limits (for superstructure items: up to 30%)	120.00 (40%) – Excess beyond Schedule A quantity
2.3	Value of Excess Quantity: Rs. 10,20,000	Rs. 10,20,000 > 1% of Initial Contract Price	No monetary threshold is prescribed; applicability is independent of value.	No monetary threshold is prescribed; applicability is independent of value.
2.4	Assessment of the applicability of the new rate	Rate adjustment clause triggered, as quantity variation exceeds 25% threshold and value exceeds 1% of the Initial Contract Price	Deviation beyond Schedule F limits; revised rate determination becomes applicable.	Governed under P.S. 63(a); no predefined quantity or value thresholds
2.5	Does the new rate apply?	Yes	Yes	Yes

4.2 Items not Covered in the Bill of Quantities

During execution, work not included in the Bill of Quantities (“BOQ”) may become necessary. Since no contractual rate exists for such work, the applicable rate must be determined under the governing contractual framework.

Non-BOQ items may be classified into the following categories:

(1) BOQ-Derivable Items (Similar Items): Items substantially similar to existing BOQ items, for which rates may be derived from corresponding contractual rates with appropriate adjustments.

(2) Schedule-Derivable Items: Items not included in the BOQ but for which rates can be derived from the applicable Standard Data Book (“SDB”) and Schedule of Rates (“SOR”).

(3) Non-Schedule Items: Items for which rates cannot reasonably be derived either from existing BOQ items or from the applicable SDB/SOR framework, thereby requiring independent rate analysis based on prevailing market rates and first-principles costing.

The contractual treatment of these categories differs across organisations. The approaches adopted under the NHAI, CPWD, and Andhra Pradesh/Telangana PWD frameworks are examined below:

4.2.1 *BOQ-Derivable Items (Similar Items)*

The Bill of Quantities (“BOQ”) is prepared at the Detailed Project Report (“DPR”) or Technical Sanction stage based on preliminary designs and estimates. During execution, however, detailed engineering and construction requirements may necessitate modification of BOQ items, including substitution of existing items or introduction of closely related items not expressly included in the original BOQ.

Such variations commonly arise due to changes in structural design requirements. For instance, an item specified as M25-grade concrete in the BOQ may need to be executed as M30-grade concrete. Depending on the contract, such changes may be treated as substituted or analogous items. In practice, the total executed quantity in the Bill of Quantities may:

(1) Remain within BOQ quantity;

(2) Exceed BOQ quantity; or

(3) Below BOQ quantity.

A typical example arises in foundation refilling work, where the BOQ may initially contemplate using excavated soil from site excavation. During execution, however, material suitability considerations or revised foundation depths may necessitate partial or complete substitution with borrowed material.

These situations may broadly manifest as:

(1) Partial substitution without quantity variation: BOQ quantity remains unchanged, but part of the work is executed using alternative material due to suitability constraints.

(2) Substitution with quantity increase: Execution quantities increase due to revised site conditions, with additional quantities executed using substituted material.

(3) Partial substitution with quantity reduction: Execution quantities reduce below BOQ estimates, but substitution is still required for part of the work.

Across all such situations, the central issue is the determination of an appropriate rate for work that is not identically represented in the original BOQ but remains substantially similar in nature.

In such cases, the rate is generally established by reference to the most comparable BOQ rate, adjusted as necessary to reflect differences in materials, labour, plant, transport, and other relevant cost components. The value of the varied work is then determined by assessing the resulting cost difference and applying the tender percentage adjustment, where applicable.

4.2.1.1 *Institutional approaches for BOQ-derivable items*

NHAI – MoRTH Standard Bidding Framework

Under the NHAI framework, items not expressly included in the BOQ are treated as additional or varied works. The valuation approach prioritises existing BOQ rates where the varied work is identical or similar, with first-principles analysis used only where similarity cannot be established.

The NHAI Works Manual adopts a structured hierarchy for the valuation of variations. The Engineer is required, in the first instance, to consider whether an existing BOQ rate can be applied directly or with suitable adjustments. Where direct application is not appropriate, the closest comparable BOQ item may be used as the basis for deriving a new rate.

The framework therefore places primary reliance on existing contract rates and recognises rate derivation from comparable BOQ items as the preferred method of valuation. At the same time, it affords the Engineer discretion to account for material differences in the character and cost of the work. The methodology is principle-based and establishes the order of valuation, but does not prescribe a fixed procedure for calculating derived rates.

CPWD – General Conditions of Contract / Works Manual Framework

Under the CPWD contractual framework, works not included in the original Schedule of Quantities are classified as "Extra Items." These refer to items that are entirely new in character and become necessary for the proper completion of the work, even though they were not envisaged under the original agreement.

CPWD does not derive rates for such items from analogous Schedule of Quantities (SOQ) entries. Where the item is available in the applicable Standard Schedule of Rates, it is treated as a "Scheduled Extra Item." In percentage-rate contracts, valuation of such items is governed by Clause 12.2(b)(i) of the General Conditions of Contract, under which payment is made on the basis of the relevant Standard Schedule of Rates specified in Schedule F, duly adjusted by the applicable cost index at the time of tendering. The resulting rate is then adjusted for the contractor's quoted percentage above or below the estimated tender cost.

Composite Andhra Pradesh State PWD GCC Framework

(Continuing in Telangana State)

The *Andhra Pradesh Detailed Standard Specifications* ("APDSS"), forming part of the State Public Works Department contractual framework, prescribe the procedure for valuation of new and supplemental items under PS to Clause 63. Unlike NHAI and CPWD, APDSS does not use the terms "variations" or "extra items" and instead uses "supplemental items" for deviations during execution. For supplemental items capable of derivation from existing agreement items, Clause 63(b) prescribes a method based on similarity with contractual items. The clause states:

63(b): For items directly deductible from similar items in the agreement, the rates shall be derived by adding to or subtracting from the agreement rate of such similar item the cost of the difference in quantity of material or labour between the new item and the similar item in the agreement, worked out with reference to the Schedule of Rates adopted in the sanctioned estimates, plus or minus the overall tender percentage.

The APDSS framework therefore expressly permits the derivation of rates from analogous agreement items. The methodology involves identifying a comparable BOQ item and adjusting the agreement rate to reflect differences in material and labour components between the original and supplemental item, with the contractor's overall tender percentage applied to the resulting adjusted cost.

Thus, different organisations adopt distinct contractual mechanisms for dealing with items not included in the original contract but required for completion of the works, where rates are determined by reference to similar items in the agreement.

To enable a direct comparison, an illustrative scenario is presented. The agreement Bill of Quantities includes an item for M35 Gradeconcrete in the superstructure. However, after design development, a superstructure element requires M40 Grade concrete, which is not included in the agreement. The use of M40 Grade concrete requires an additional 20 kg of cement, with no change in other material, labour, or machinery components. The cost of cement is Rs. 8,000 per MT. The tender premium and the rate for M35 Gradeconcrete are as set out in Table 4.2.

Table 4.2 Comparison of Rate Derivation for Similar Non-Agreement Items

S.No.	**Particulars**	**NHAI**	**CPWD**	**Telangana State**
(1)	*(2)*	*(3)*	*(4)*	*(5)*
I	Category: Superstructure Works			
1	Item No. 1			
1.1	Rate of M35 Grade Concrete as per Agreement (Rs./m^3)	8,500	8,500	8,500
1.2	Cement Content (kg/m^3)	380.00	380.00	380.00
1.3	Rate of Cement (Rs./MT)	8,000	8,000	8,000
2	Non-Agreement Item: Superstructure Works	Similar to Item No. 1 in BOQ	Scheduled Extra Item	Similar to Item No. 1 in Schedule A.

2.1	Description of Item	M40 Grade Concrete	M40 Grade Concrete	M40 Grade Concrete
2.2	Cement Content (kg/m^3)	400.00	400.00	400.00

Table 4.2 *(Concluded)*

S.No.	**Particulars**	**NHAI**	**CPWD**	**Telangana State**
(*1*)	(*2*)	(*3*)	(*4*)	(*5*)
2.3	Whether rate is derived from agreement? If not, basis of derivation	Yes, derived from BOQ	No, derived from Schedule F	Yes, derived from Schedule A
2.4	Additional Cement Quantity over M35 GradeConcrete (kg) [2.2 – 1.2]	20.00	20.00	20.00
2.5	Procedure for the Determination of Rate	Comparable BOQ item with appropriate adjustment	Clause 12.2(b)(i) of GCC	PS 63(b) of APDSS
2.6	Agreement rate for M35 GradeConcrete as per S. No. 1.1	8,500	8,500	8,500
2.7	Rate provided in the Sanctioned Estimate (Agreement Rate/1.05)	Not prescribed; determined by the Engineer	8,500/1.05 = 8,095	Not Applicable
2.8	Add: Cost of Additional Cement (Rs.)		20 x 8,000 / 1000 = 160	20 x 8,000 / 1000 = 160
2.9	Base Rate (Rs. /m^3)		(S. No. 2.7 + S. No. 2.8) = 8,255	(S. No. 2.6 + S. No. 2.8) = 8,660
2.10	Add: Tender Premium @ 5%		(on S. No. 2.9) 413	(on S. No. 2.8) 8
2.11	Final Rate Payable (Rs. /m^3		**8,668**	**8,668**

The comparison in Table 4.2 illustrates that, for non-agreement items that are substantially similar to existing agreement items, all three frameworks can ultimately yield the same payable rate, notwithstanding differences in contractual procedure. The principal distinction lies in the route adopted for rate determination. While the Telangana framework expressly prescribes derivation from a comparable agreement item and CPWD proceeds through the applicable Schedule of Rates, the NHAI framework relies on the Engineer's assessment of the most appropriate basis for valuation.

4.2.1.2 *Institutional approaches for items not included in the original contract but derivable* *from the Standard Data Book and SOR*

NHAI–MoRTH Standard Bidding Document Framework

Under the NHAI–MoRTH Standard Bidding Document framework applicable to International Competitive Bidding (ICB) contracts, the determination of rates for items of work that are not included in the original Bill of Quantities (BOQ) is governed by Clause 52.1 of the General Conditions of Contract. The provision establishes the contractual mechanism for valuing variations and additional works where no directly applicable contract rate exists.

This approach promotes consistency in valuation and preserves the commercial basis upon which the parties entered into the contract. However, where a new item of work differs materially from the items included in the Bill of Quantities and no reasonable derivation of rates is possible, the contract contemplates a separate process for the determination of an appropriate rate.

Clause 52.1 provides that where an item is not covered by an existing contract rate and cannot be fairly valued through derivation from similar BOQ items, the Engineer is required to undertake consultations with the Employer and the Contractor for the purpose of establishing a suitable rate or price. The provision recognises that additional works may arise during project execution that were not anticipated at the time of tendering and therefore require an independent valuation exercise.

The contractual framework establishes the following hierarchy for the determination of rates for non-BOQ items:

(1) Application of existing contract rates

The first step is to examine whether the additional or varied item can be valued using rates already available within the contract. This includes situations where the work is substantially similar to an existing BOQ item or where a reasonable rate can be derived from analogous contract items through appropriate adjustments. Preference is therefore given to maintaining consistency with the contractual rate structure before resorting to the formulation of entirely new rates.

(2) Determination through consultation and agreement

Where no suitable contract rate exists and derivation is not feasible, the Engineer is required to consult both the Employer and the Contractor with a view to arriving at a mutually acceptable rate or price. This stage reflects the collaborative nature of contract administration and seeks to achieve a valuation that fairly compensates the Contractor while remaining consistent with the contractual and commercial framework of the project. Relevant considerations may include the nature of the work, resource requirements, construction methodology, prevailing market conditions, productivity norms, and other project-specific factors.

(3) Engineer’s determination in the absence of agreement

Where consultations do not result in agreement between the parties, the contract empowers the Engineer to determine an appropriate rate or price. In exercising this function, the Engineer is expected to apply professional judgment and evaluate all relevant material available at the time, including cost inputs, market evidence, technical requirements, and the overall contractual context. Following such determination, the Engineer is required to notify the Contractor of the fixed rate or price, with a copy provided to the Employer.

The contractual scheme therefore assigns a pivotal role to the Engineer in the valuation process. While agreement between the parties remains the preferred outcome, the contract also provides a mechanism for unilateral determination by the Engineer where consensus cannot be achieved. This ensures that execution is not disrupted by unresolved valuation issues and that progress continues despite disagreements on rates.

Accordingly, the NHAI–MoRTH ICB contractual framework recognises that new or unforeseen items may arise during project execution and provides a structured methodology for their valuation. The framework balances the objective of maintaining consistency with existing contract rates, encouraging negotiated resolution between the parties, and enabling the Engineer to make a final determination where agreement proves impossible. In this manner, the contract seeks to ensure fairness, administrative efficiency, and continuity of project execution.

CPWD – General Conditions of Contract / Works Manual Framework

Under the CPWD contractual framework, works that are not included in the original Schedule of Quantities are categorised as “Extra Items.”

Where an item exists in the applicable Standard Schedule of Rates, it is treated as a "Scheduled Extra Item." In percentage-rate contracts, valuation is governed by Clause 12.2(b)(i) of the General Conditions of Contract. Payment is based on the rates specified in the Standard Schedule of Rates in Schedule F, adjusted by the cost index at the time of tendering, and the contractor's quoted percentage above or below the estimated tender cost.

Composite Andhra Pradesh State PWD GCC Framework

(Continuing in Telangana State)

The *Andhra Pradesh Detailed Standard Specifications* ("APDSS"), forming part of the State PWD contractual framework and continuing in Telangana State, prescribe the valuation of new items under PS 63. For items not derivable from analogous items in the agreement, PS 63(c) provides for determination of rates based on the Standard Schedule of Rates together with the accepted overall tender percentage, as extracted below:

63(c): For new items which do not correspond to any items in the agreement, the rates shall be the Standard Schedule of Rates plus or minus the overall tender percentage.

For the purpose of this clause, the "Standard Schedule" refers to the Schedule of Rates based on which the technical sanction for the work was accorded.

The principal features of the rate determination mechanisms applicable to non-agreement items derivable from the Standard Data Book and Schedule of Rates under the NHAI, CPWD, and Telangana frameworks are summarised in Table 4.3.

Table 4.3 Comparison of Rate Determination for Non-Agreement Items

Derivable from the Standard Data Book and Schedule of Rates

S.No.	Particulars	NHAI	CPWD	Telangana State
1	Terminology used	New Items (Non-BOQ); Additional or Varied Work	Scheduled Extra Items	No specific terminology is prescribed. Such works are treated as Supplemental Items under APDSS and as Authorised Extras in work bills.

2	Relevant Clause Governing Rate Determination	Clause 52.1 of the GCC applicable to ICB Contracts	Clause 12.2(b)(i) of the General Conditions of Contract	PS 63(c) of APDSS
3	Procedure for Rate Determination	The Engineer consults the Employer and the Contractor to determine mutually acceptable rates for the varied or additional work.	Rates are derived from the Schedule of Rates (SOR) specified in Schedule F, adjusted by the applicable cost index prevailing at the time of tendering, after which the accepted tender premium or discount is applied.	Rates are ordinarily based on the Standard Schedule of Rates (SSR) with the applicable overall tender premium or discount. Where a non-Schedule-A item is not derivable from the Standard Data Book or the applicable Standard Schedule of Rates, the rate is determined on the basis of analysed prevailing market rates.

4.2.1.3 *Institutional approaches for items not included in the original contract and not derivable from the Standard Data Book and Schedule of Rates*

Additional or varied items may arise during project execution that are neither included in the original Bill of Quantities (BOQ) nor derivable from the Standard Data Book (SDB) or the applicable Schedule of Rates (SOR). In such circumstances, conventional rate derivation mechanisms are unavailable, requiring alternative contractual procedures for valuation.

NHAI–MoRTH Standard Bidding Document Framework

Under the NHAI–MoRTH framework applicable to International Competitive Bidding (ICB) contracts, such items may be executed on a daywork basis under Clause 52.4 of the General Conditions of Contract. The provision empowers the Engineer to direct that varied work be executed as daywork and valued in accordance with the daywork schedule forming part of the contract.

The daywork mechanism is intended for works where reliable advance quantification or rate analysis is impracticable owing to the uncertain or variable nature of the work. Valuation is based on the actual labour, materials, and equipment deployed, supported by contemporaneous records and subject to verification and certification by the Engineer. Accordingly, Clause 52.4 provides a contractual mechanism for valuing items that cannot be assessed through existing contract rates or standard rate schedules while maintaining appropriate financial control and accountability.

CPWD – General Conditions of Contract / Works Manual Framework

Under the CPWD contractual framework, items not included in the original Schedule of Quantities and not derivable from the applicable Standard Schedule of Rates are treated as Non-Scheduled Extra Items. In percentage-rate contracts, the valuation of such items is governed by Clause 12.2(a) of the General Conditions of Contract.

Clause 12.2(a) requires the Contractor to submit, within fifteen days of the order directing execution of the extra item or the occurrence of the item, an analysis of rates based on the basic rates contained in the Standard Schedule of Rates specified in Schedule F together with prevailing market rates for materials not covered therein. The clause further provides that materials unavailable in the Standard Schedule of Rates are to be valued based on documentary evidence, including tax-paid invoices and manufacturer specifications.

Accordingly, the CPWD framework adopts an analytical rate-building approach for the valuation of Non-Scheduled Extra Items. While the Standard Schedule of Rates continues to provide the primary reference for rate determination, materials and inputs not covered therein are valued using prevailing market evidence supported by documentary records. The mechanism therefore seeks to ensure that valuation remains both evidence-based and responsive to actual market conditions.

Unlike the NHAI–MoRTH framework, CPWD does not expressly provide for execution on a pure daywork basis founded upon actual labour, material, and equipment deployment certified contemporaneously during execution. Further, unlike the APDSS framework, the CPWD provisions do not specifically address situations in which rates cannot reasonably be determined before execution or in which the work itself is incapable of precise measurement due to irregular geometry, artistic detailing, restoration characteristics, or similar practical constraints. Consequently, the CPWD mechanism remains primarily oriented toward deriving analytical rates, even for extra and non-scheduled items.

Composite Andhra Pradesh State PWD GCC Framework

(Continuing in Telangana State)

The *Andhra Pradesh Detailed Standard Specifications* (APDSS), forming part of the State PWD contractual framework and continuing in Telangana State, prescribe the procedure for valuation of new items for which rates are neither available in Schedule A nor derivable from the Standard Data Book or Standard Schedule of Rates. PS 63(d)(ii) provides for the determination of rates, extracted below:

> (ii) The contractor shall execute the work upon written orders from the Executive Engineer and the cost of labour and materials plus 10 per cent thereon shall be allowed therefor. Provided that the vouchers for the labour and materials employed shall have been delivered to the Executive Engineer or his representative within seven days after such work shall have been completed. If the Executive Engineer considers that payment for such work on the basis of the vouchers presented is unduly high, he shall make payment in accordance with such valuation as he considers fair and reasonable [...]

The APDSS framework thus adopts an actual cost reimbursement mechanism supported by vouchers relating to labour and materials, together with a prescribed percentage addition. The Executive Engineer retains authority to assess the reasonableness of the amounts claimed and determine a fair valuation where necessary.

A distinctive feature of the APDSS framework is its express recognition of situations in which rates cannot be determined before execution or where the work itself is not capable of proper measurement. PS 63(e) provides that, in such circumstances, valuation shall be undertaken in accordance with PS 63(d)(ii). This provision extends the reimbursement-based mechanism to works that are irregular, restoration-oriented, artistic, ornamental, or otherwise not readily amenable to conventional measurement and rate-analysis techniques.

Compared with the NHAI–MoRTH and CPWD frameworks, APDSS adopts a broader approach to valuation of non-agreement items that are not derivable from the Standard Data Book or Schedule of Rates. While the NHAI–MoRTH framework relies on a daywork mechanism and the CPWD framework principally adopts a rate-analysis approach, APDSS expressly provides for reimbursement-based valuation where prior rate determination or accurate measurement is impracticable.

The comparative position emerging from the above frameworks is summarised in Table 4.4

Table 4.4 Comparative Framework for Determination of Rates for Items Not Covered by the Contract and Not Derivable from the Standard Data Book and Schedule of Rates

S.No.	**Particulars**	**NHAI**	**CPWD**	**Telangana State**
(*1*)	(*2*)	(*3*)	(*4*)	(*5*)
1	Terminology used	Daywork	Non-Scheduled Extra Items	Additional Works
2	Relevant Clause governing the determination of rates	Clause 52.4 of the General Conditions of Contract applicable to ICB Contracts	Clause 12.2(a) of the General Conditions of Contract	PS 63(d)(ii) and PS 63(e) of APDSS
3	Procedure prescribed for the determination of rates and payment	Payment is made under the daywork schedule forming part of the contract. The Contractor is required to maintain and submit records relating to labour, materials, and equipment for verification and certification by the Engineer.	The Contractor is required to submit a rate analysis based on the Standard Schedule of Rates specified in Schedule F. Materials not covered by the Schedule of Rates are valued based on prevailing market rates supported by documentary evidence, including tax-paid invoices and manufacturer specifications.	Payment is based on the actual cost of labour and materials plus 10 per cent, supported by vouchers submitted to the Executive Engineer. The Executive Engineer may determine a fair and reasonable valuation where the claimed amount appears excessive. The framework also applies where rates cannot be determined before execution or where the work is incapable of proper measurement.

4.3 Substitute Items

Substituted works arise where an original Bill of Quantities (BOQ) item is replaced by another item involving a different specification, material, or method of execution while substantially achieving the same functional facet contemplated under the contract. For example, foundation backfilling may be executed using sand instead of excavated soil, or mosaic flooring may be replaced by marble flooring. The newly introduced work is referred to as the substitute item, while the original BOQ item that is replaced is the substituted item.

A substitute item is not an independent category of work. Depending on its nature and the applicable contractual framework, it may be treated as a similar item, a scheduled extra item, or a non-scheduled extra item for the purpose of rate determination. The rate payable is therefore governed by the contractual mechanism applicable to the substituted work.

Substitution may relate to the whole or part of an existing BOQ item. In certain cases, the quantity of the substitute item may exceed the quantity originally contemplated under the BOQ item being replaced.

4.4 Additional Items

Among the contractual frameworks examined, the Composite Andhra Pradesh State PWD GCC Framework expressly recognises the category of Additional Items. These are works found necessary after the award of the contract but which do not alter or interfere with the execution of the original work entrusted under the contract.

An example would be the provision of a parking area in a building project where no such facility was originally contemplated but subsequently becomes necessary. Such works are ordinarily required to be entrusted through a separate tender process.

However, if inviting fresh tenders is considered undesirable, the additional work may be entrusted to the original contractor on a nomination basis, subject to the monetary limits prescribed under the applicable delegation of powers. Where the value exceeds such limits, approval of the next higher authority is required.

Execution of additional items is permissible only after approval of a separate estimate, revised estimate, or work slip by the competent authority and is ordinarily undertaken at rates not exceeding the estimate rate.

4.5 Omissions

During the execution of a project, certain items or quantities included in the BOQ may become redundant due to site conditions, design modifications, technical considerations, changes in construction methodology, optimisation of works, or instructions issued by the Employer or Engineer-in-Charge. In some cases, only part of the quantity of an item may be omitted or replaced by another specification, while in others, the entire item may be deleted from the scope of work.

The BOQ serves primarily to ensure uniformity in bidding and to facilitate comparative evaluation of bids. An inclusion of an item or quantity does not, by itself, confer upon the contractor an absolute right to execute the entire quantity or any portion thereof solely based on commercial advantage.

Accordingly, most contractual frameworks confer upon the Engineer-in-Charge the authority to reduce, omit, vary, or substitute items during execution, subject to the terms of the contract. Such deletions or reductions are referred to as authorised omissions and typically result in a corresponding adjustment of the contract price to the extent of the omitted work.

Illustratively, under standard public works contracting practice, the Engineer is generally empowered, subject to the approval requirements prescribed under the contract, to omit any BOQ item, with the consequence that the contractor is not entitled to claim compensation solely on account of such omission.

The power of omission forms an integral element of variation jurisprudence, reflecting the reality that actual site conditions often differ from tender-stage assumptions. Unless contractually restricted, omissions within the permissible scope of variation do not constitute breach merely because they reduce the contractor's opportunity to execute profitable items. However, disputes may arise where omissions are alleged to be arbitrary, mala fide, or intended to divert work to third parties.

5 Judicial Interpretation of Contractual Variations and Extra Item Claims

This section summarises how courts have interpreted contractual provisions on variations, substituted and extra items, omissions, and rate determination. It highlights the limits of arbitral discretion, evidentiary requirements, and the scope of judicial oversight, providing apposite guidance for professionals handling claims under construction contracts.

In *Ram Nath International Construction Pvt. Ltd. v. State of U.P.*,[23] the issue before the Supreme Court was whether the contractor was entitled to payment for an extra item of earthwork beyond lip cutting under the contract for “Lining of the Upper Ganga Canal from km 189.50 to km 197.0 in U.P.” The dispute arose in relation to payment for additional earthwork in a specified reach, which was referred to arbitration and decided by a speaking award in favour of the contractor.

The Supreme Court held that the dispute involved interpretation of the contract and therefore fell within the scope of the arbitral reference. It further held that the arbitrator had acted within jurisdiction and that the High Court was incorrect in concluding that the claim was beyond the scope of the reference, since the matter was referable to contractual interpretation and within the arbitral mandate.

In the *State of Rajasthan v. Nav Bharat Construction Co.*,[24] the Supreme Court considered whether a contractor was entitled to claim extra rates for work that was already contemplated under the contract for the construction of Bhimsagar Dam. The dispute arose in arbitral proceedings where the contractor sought enhanced rates by treating certain contractual work as extra work.

The Supreme Court distinguished between contractual items and genuine extra work, observing that work specified in the contract does not become extra work merely because additional payment is claimed. Rates applicable to extra items can be invoked only in respect of work falling outside the contractual scope. Accordingly, the Court held that the contractor was not entitled to claim enhanced rates for work already covered by the contract and disallowed the claim as being contrary to the contractual terms.

In *Food Corporation of India v. A.M. Ahmed & Co.*,[25] the Supreme Court considered whether an arbitrator could award rates contrary to the contractual provisions governing valuation of executed work, including extra and non-BOQ items. The dispute arose in arbitral proceedings in which the contractor was awarded certain claims based on rates that were not strictly aligned with the contractual mechanism.

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[23] *Ram Nath International Construction Pvt. Ltd. v. State of U.P.”*, (1997) 1 SCC 645 (India).
[24] *State of Rajasthan v. Nav Bharat Construction Co.*, (2010) 1 SCC 86 (India).
[25] *Food Corporation of India v. A.M. Ahmed & Co***.,** (2006) 13 SCC 779 (India).

The Supreme Court held that an arbitrator derives authority from the contract and is bound by its terms. Where the contract prescribes a specific mechanism for determination of rates, including rates for extra or non-BOQ items, the arbitrator cannot disregard such provisions and award amounts on a different basis. Accordingly, the Court held that the arbitrator had erred in departing from the contractual stipulations and that the award was liable to interference to that extent.

In *Delhi Development Authority v. R.S. Sharma & Co.,*[26] the Supreme Court considered whether a contractor was entitled to additional payment for extra lead in the transportation of stone aggregates despite a contractual provision requiring the contractor to bear responsibility for procurement and carriage irrespective of source.

The Supreme Court examined the relevant contractual clause, which stipulated that the quoted rates included all leads and that no revision of rates would be permissible on account of changes in the source of material. The Court held that the contractor had assumed responsibility for procurement and transportation irrespective of distance and therefore could not claim additional payment merely because materials were obtained from a more distant quarry. Such a claim could arise only where the employer had specifically directed procurement from a particular distant source. In the absence of any such direction, the claim was contrary to the contract. Accordingly, the Court held that the arbitrator had disregarded the express contractual provisions and set aside the award insofar as it allowed the claim for extra lead charges.

In *Delhi Development Authority v. S.S. Jetley*,[27] the Delhi High Court considered whether a contractor was entitled to payment for alleged extra items based on quantities recorded in pencil in the Measurement Book. The dispute arose from an arbitral award granting payment for certain quantities of excavation and rock work claimed by the contractor as additional work.

The Court held that claims for extra items must be supported by reliable contemporaneous records. The Court observed that entries in the Measurement Book must be clear, intelligible, and maintained in the ordinary course of record keeping. As the relevant entries were recorded in pencil, those lacked evidentiary reliability and had not been reflected in either the final bill

[26] *Delhi Development Authority v. R.S. Sharma & Co.*, (2008) 13 SCC 80 (India).
[27] *Delhi Development Authority v. S.S. Jetley*, 81 (1999) DLT 681 (Del) (India).

or the statement of claims; the Court held that the award in respect of those items could not be sustained and accordingly disallowed the claim.

In *Delhi Development Authority v. M/S Swastic Construction Co.*,[28] one of the issues before the Delhi High Court was whether the contractor was entitled to payment at market rates for extra items, substituted items, and deviated items on the basis of internal office notings of the employer.

The appellant awarded a contract to the respondent for the development of 443.44 hectares of land in Sectors 34 and 35, Rohini, Delhi, including the construction of a sewage treatment plant. Disputes subsequently arose between the parties and were referred to arbitration.

Among other claims, Claim Nos. 2 and 3 pertained to payment for extra items, substituted items, and deviated items allegedly executed but not paid for. The Sole Arbitrator awarded amounts in favour of the respondent, inter alia, under the following claims:

Claim No. 2 pertained to payment for extra items, substituted items, and deviated items executed but not paid for, amounting to Rs. 13,45,184/-.

Claim No. 3 pertained to payment for extra items, substituted items, and deviated items executed but not paid for, amounting to Rs. 1,07,49,740/-.

The appellant challenged the award under Section 34 of the Arbitration and Conciliation Act, 1996.[29] The learned Single Judge dismissed the objections and upheld the award.

Aggrieved thereby, the appellant preferred an appeal under Section 37 of the Arbitration and Conciliation Act[30] before the Division Bench of the Delhi High Court. It was contended that the Arbitrator and the learned Single Judge had failed to appreciate the effect of Section 73 of the Indian Contract Act, 1872.[31]

The Division Bench examined the evidentiary value of the office notings relied upon by the contractor. In relation to Claim No. 2, the Court held that the relevance of the office notings

[28] *Delhi Development Authority v. M/s Swastic Construction Co.*, FAO (OS) (COMM) 179/2021 (Del HC, Dec. 20, 2021).
[29] Arbitration & Conciliation Act, No. 26 of 1996,1996, § 34 (India).
[30] Id. § 37.
[31] Indian Contract Act, No. 9 of 1872, § 73 (India).

could not be disregarded merely because they constituted internal departmental communications. In relation to Claim No. 3, the Court observed that DDA had accepted and utilised the additional work executed by the contractor but failed to make payment for the same.

Accordingly, the Division Bench upheld the arbitral award as well as the judgment of the learned Single Judge and dismissed the appeal.

In *Som Datt Builders-NCC-NEC (JV) v. National Highway Authority of India*,[32] the principal issue before the Supreme Court was whether Clause 52.1 of the General Conditions of Contract permitted renegotiation of rates for variations in quantities arising from estimation errors in the Bill of Quantities (BoQ), absent any instructed change in design or scope.

The contract for four-laning of a section of NH-2 near Kanpur contained a detailed BoQ against which rates were quoted. During execution, the quantity of reinforced earth structure with geogrid exceeded the BoQ provision. The Engineer sought revision of rates for the excess quantity under Clause 52.2, treating it as a variation warranting re-pricing. The contractor disputed this, contending that the increase resulted from estimation errors rather than any contractual variation in scope or design.

The Dispute Review Board recommended payment for the excess quantity at the BoQ rate, and the Arbitral Tribunal concurred. The award was challenged by the employer under Sections 34 and 37 of the Arbitration and Conciliation Act, 1996,[33] but was sustained by the learned Single Judge and later set aside by the Division Bench.

The Supreme Court held that a mere increase in quantities due to estimation errors does not constitute a contractual variation justifying rate renegotiation under Clause 52.1. Such an interpretation, the court observed, would improperly extend the scope of variation clauses beyond their contractual intent.

Accordingly, the Supreme Court set aside the judgment of the Division Bench and restored the arbitral award as well as the decision of the learned Single Judge.

[32] *Som Datt Builders-NCC-NEC (JV) v. National Highway Authority of India*, [2025] 2 S.C.R. 203, 2025 INSC 113.
[33] Arbitration & Conciliation Act, 1996, § 34, 37 (India).

The above decisions reflect a consistent approach to disputes concerning variations, extra items, substituted items, and valuation of works. Claims for payment must remain anchored to the contractual framework governing rate determination, while execution of the work must be established through reliable evidence and compliance with contractual procedures. The jurisprudence further affirms that neither administrative discretion nor arbitral determination can override express contractual provisions governing valuation and payment.

6 Synthesis

In claims relating to extra items, courts have consistently placed decisive emphasis on the evidentiary discernment of Measurement Book entries, requiring that they be clear, intelligible, and recorded in the ordinary course of execution of work. Entries that are ambiguous or lack procedural authenticity, particularly those not maintained in the regular course or recorded in pencil, are generally held insufficient to substantiate monetary claims. A further consistent principle is that claims for extra items must be reflected either at the stage of final bill preparation or specifically raised in the Statement of Claims; failure to do so is treated as affecting the credibility and acceptability of such claims.

7 Recommendations

It is recommended that public infrastructure organisations in India move towards a uniform General Conditions of Contract (GCC) for construction works funded through internal resources, whether at the Central or State level. Such a uniform GCC should apply across executing agencies and infrastructure sectors, including highways, buildings, irrigation, and allied works, to ensure consistency in the treatment of variations, extra items, substituted items, omissions, and valuation of works.

One important step towards such harmonisation should be the adoption of standard contractual terminology applicable across public infrastructure contracts. At present, different organisations employ varying terms to describe substantially similar concepts, creating interpretational uncertainty and administrative inconsistency. Table 7.1 proposes a standardised set of definitions and terminology that may be incorporated into a uniform GCC for public works contracts.

Table 7.1 Definitions of Contract Variation and BOQ-Related Terms

S.No.	Description	Term Proposed
1	**Items of work which, though found necessary after award of the Contract, can be executed independently without affecting or interfering with the execution of the original work under the Contract.**	Additional Items
2	Aggregate of all authorised increases in the Contract Price arising from Excess over BOQ, Supplemental Items, and Additional Items.	Authorised Extras
3	**Cumulative total of all negative deviations authorised under the Contract**	**Authorised Omissions**
4	The priced and completed Bill of Quantities forming part of the bid, used for the determination of the Contract Price.	Bill of Quantities
5	The price stated in the Letter of Acceptance and thereafter adjusted in accordance with the provisions of the Contract.	Contract Price
6	Increase or decrease in the quantity of a BOQ item executed under the Contract as compared to the Bill of Quantities.	Deviation
7	Excess quantity executed over the quantity mentioned in the Bill of Quantities for an item	Excess over BOQ
8	Items not included in the original Bill of Quantities but whose rates are derivable from the applicable Standard Data Book and Schedule of Rates.	Extra Items
9	**The rate determined by the employer based on prevailing material and labour costs at the site of execution, together with the prescribed percentage towards overheads and Contractor's profit as provided in the Contract.**	Market Rate
10	The quantity actually executed is less than the quantity stipulated in the Contract.	Negative Deviation
11	Items of work not included in the Original Bill of Quantities and for which rates cannot be reasonably derived from the applicable Standard Data Book, Schedule of Rates, or similar existing Contract items.	New Items
12	A document published periodically, ordinarily on an annual basis, containing the prevailing rates of materials, labour, machinery hire charges, carriage, and other inputs, used for the determination of rates of items in Estimates and Contracts.	Schedule of Rates
13	Items of work not included in the Original Bill of Quantities but for which rates are reasonably derivable from analogous or similar items contained in the Bill of Quantities.	Similar Items
14	A compilation containing the standard consumption norms and coefficients of materials, labour, machinery, and other inputs required for execution of an item of work, used as the basis for analysis and derivation of item rates.	Standard Data Book
15	An item of work not included in the original Contract but found necessary during execution and introduced in	Substitute Item

	substitution of an item in the Bill of Quantities, either wholly or partly.	
16	Items of work found necessary after award of the Contract and which interfere with, modify, or are inseparably connected with the execution of the original works under the Contract, including Similar Items, Extra Items, New Items, and Daywork Items.	Supplemental Items
17	Any authorised alteration in quantities, specifications, design, scope, or method of execution of the Works during the course of contract performance, including additions, omissions, substitutions, and quantity deviations.	Variations

The proposed terminology provides a common framework for the classification of variations, determination of rates, valuation of work, and administration of contractual changes. Adoption of uniform definitions would facilitate consistent interpretation across organisations and reduce disputes arising from differences in nomenclature and drafting.

A uniform GCC would not preclude contractual flexibility. Project-specific, location-specific, and organisation-specific requirements may continue to be addressed through Special Conditions of Contract (SCC). Similarly, externally funded projects may continue to be governed by lender-mandated contractual frameworks to the extent required by financing conditions.

The importance of standardisation extends beyond contractual clauses and should encompass:

(1) Contractual terminology relating to variations and BOQ adjustments;
(2) Valuation procedures and rate determination mechanisms;
(3) Hierarchy of rate fixation (BOQ rates, analogous items, Standard Data Book/Schedule of Rates, and market rates);
(4) Delegation of powers for approval and sanction of variations; and
(5) Monetary thresholds governing approval levels and escalation of authority.

Uniformity across these elements would ensure that identical or substantially similar contractual situations are not subjected to divergent treatment across organisations, thereby reducing interpretational ambiguity and administrative inconsistency.

Within such a framework, uniform procedures should be evolved for:

(1) Classification of variations;
(2) Determination of rates for non-BOQ and derived items;
(3) Approval and sanction of variations and extra items;
(4) Maintenance and evidentiary integrity of measurement records; and
(5) Documentation and processing of claims arising during execution.

Such harmonisation would reduce disputes and improve transparency, predictability, efficiency, and consistency in contract administration across public infrastructure projects in India.

8 CONCLUSIONS

8.1 Overview of Study

The study examined contractual practices relating to variations, extra items, substituted items, and related valuation mechanisms in public infrastructure projects in India, with emphasis on inconsistencies across organisations.

8.2 Key Findings

The analysis indicates variations in:

(1) Contractual terminology;
(2) Valuation procedures for extra and substituted items;
(3) Hierarchy of rate determination; and
(4) Delegation of approval powers.

These inconsistencies result in divergent treatment of similar contractual situations across organisations, contributing to disputes, ambiguity, and inefficiencies in contract administration.

8.3 Judicial Principles on Contract Administration

Judicial decisions consistently emphasise:

(1) Properly maintained Measurement Books as primary evidence;
(2) Clear and contemporaneous recording of executed work; and

(3) Raising of claims at appropriate contractual stages, particularly in final bills or formal statements of claims.

Ambiguous or improperly maintained records are generally not accepted as reliable evidence for monetary claims.

8.4 Overall Conclusion

The study establishes the need for a structured and uniform contractual framework governing public infrastructure works in India. A harmonised General Conditions of Contract, supported by standardised terminology, valuation principles, and approval mechanisms, would reduce disputes and improve administrative consistency.

8.5 Basis for Recommendations

Based on the findings of the study, recommendations are set out in Section 7. These focus on standardisation of contractual terminology, harmonisation of variation procedures, and adoption of uniform valuation and approval frameworks to improve efficiency, transparency, and consistency in public works contract administration.

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