GUIDELINES FOR OPTIMAL UTILIZATION OF ALUMINIUM FORMWORK

Change History

Policy No.	Version No	Issued by	Date	Reviewed by	Approved by
STR 10	1	Structural Design	11 May 2021		
STR 10	2	Structural Design	31 Mar 2022	COO – UT Region Procurement – Civil Material Management Head Lodha QA Team	MD HoC – Structure Design

Background

Company purchases large volume of formwork (aluminum, jump form etc.). However, due to lack of focus in upstream design and poor handling at sites, the utilization of formwork has been much lower than anticipated leading to increased costs for the company.

HoC – Structural Design will be responsible for ensuring highest level of utilization of formwork such that its investment cost is fully recovered.

A decision is made to shift to component – based approach from the existing typology – based approach of managing aluminum formwork inventory. Central Formwork Yard (CFY) at Upper Thane is setup and will have the necessary infrastructure for refurbishment, storage and modifications. A sub-facility (planned 2 – 3 year timeframe) is being created at Palava site for utilizing the existing stock and storing formwork.

Both formwork yards shall be overseen by HoC – Structural Design with a specialist team under him. The COO of the UT region will be accountable for the efficient operations of the yard and ensuring that the theft is kept to nil and scrap sales happen as per norms and in timely manner. HoC – Structural Design along with the COO of UT & Palava Region will be sole decision maker regarding this policy.

Process Standardization:

Architectural Design	1.0 Design Standardization for Formwork Efficiencies.pdf
Modularity Guidelines to New Vendors	2.0 Vendor Aluform Design Guidelines.pdf
Guidelines to Modification Vendors	3.0 Lodha Aluform Modification Guidelines.pdf
Shell Drawings to Modulation Drawings	4.0 Drawing Management.pdf
CFY Operations & Organization	5.0 CFY SOP.pdf (under revision)
Scrapping Guidelines	6.0 Aluform scraping criteria.pdf

Policy Outline:

This policy should be read in conjunction with the above listed six documents.

1. New Formwork Target Costs (per sq.m. per repetition): Formwork cost is arrived at as **Purchase Cost** (PC) plus **Life Cycle Maintenance** (LCM) costs. LCM varies with number of storyes in the building and planned building repetitions. Budget Costs for new aluminum formwork are based on 80 repetitions with LCM cost premium added to Purchase costs as per the table below:

LCM Premium on FW costs							Per floor Budget Cost (Rs) based on 80 reps					
	Number of Planned Buildings							Number of Planned Buildings				
Storyes	1	2	3	4	5		Storeys	1	2	3	4	5
15	69%	34%	23%	17%	0%		15	251	200	183	174	149
20	52%	26%	17%	0%			20	225	187	174	149	
25	41%	21%	14%				25	210	179	169		
30	34%	17%	0%				30	200	174	149		
35	29%	15%					35	192	170			
40	26%	0%	**Suggested Formwork Type**				40	187	149	Purchase Cost Rs		11880
45	23%			**New** Formwork			45	183		No of Repetitions		80
50	21%			**Modified** Formwork			50	179	0% LCM Premium case Rs			149

Example: 25 storey typology with 2 planned buildings in sequence -number of floor repetitions = 50. Modification is needed for the balance 30 repetitions. LCM Premium Rs 1530 is charged on first 50 repetitions. Budget cost = (11880x50/80 + 1530) = Rs 179 (LCM premium 21%) per sq.m.

2. Life Cycle Maintenance (LCM) costs (Modification Premium) gets credited to CFY budget to cover the expenses towards CFY overhead, Cleaning + Lacquering, Modification Charges for formwork reuse.

3. For a new building, a decision on new formwork or modified formwork or a hybrid model will be taken based on the above suggested framework by HoC – Structural Design and COO of UT region in consultation with respective project COO. In case of disagreement, the decision of unit CEO is final.

4. To achieve optimum cost, Design Standardization for Formwork Efficiencies shall be followed. Major deviations to the Design Standardization guidelines shall need approval from Chief Designer.

5. No changes to the shell drawings shall be accepted after the coordination and approval from architect/structure/CM team. That means request for changes post approval of Shell Drawings shall not be entertained.

6. Scrap Criteria – Each component entering into CFY will be examined for warping, surface unevenness, weld separation and other deficiencies. Necessary instrumentation will be kept in place for this purpose. Until such time manual inspections will continue. 15% of scrap costs will be credited to CFY budget towards service charges.

7. It is recognized that the scrapping criteria for small sized panels shall be different to large size panels. Further, items like GI props, aluminum prop heads, kickers, extrusion items (IC, ICE, MB, EB, SL, DP, RK, SSC and SSCE) need different scrapping/maintenance criteria. On this note, it is assumed that only 75% of the purchased material will get scrapped at the end of 80 repetitions and rest 25% will get scrapped after 160 repetitions. This approach helps in bringing down the embodied carbon in the construction.

8. Present minimum Scrap value at the end of 80 repetitions for 75% materials is estimated at INR 3,564/sqm. For the balance 25% material the asset value at 80 repetitions is estimated (from the attached depreciation chart) as INR 6646 /sqm. Average increase in asset value = Rs 667/ sqm.

9. Duties of Central Formwork Yard (CFY):
   a) Coordination with CPT, Design, CM Teams on procurement of New Formwork
   b) Preparation of Shell drawings and Modulation drawings
   c) Material Management at Yard – Formwork panels, Props and MS Ancillary items
   d) Coordination with modification vendors and leasing modified formwork to projects
   e) Coordinates with CPT on scrap management and disposal

10. **Budget cost of modified formwork** – CFY arrives at the cost of modified formwork based on unutilized Purchase Cost of the material minus 85% of the scrap value. This value stands at **72% of Purchase Cost** per sqm per repetition (**present value Rs 111**).

11. **Budget costs for Hybrid model** – Future purchases of formwork are likely to be based on component based rather than typology based. In the hybrid model, CFY recommends use of certain percentage of new components and balance from the material at yard. The target costs for hybrid model will be based on weighted average of the two materials.

12. CFY will charge to the respective unit COO for any FW components required for miscellaneous works on the basis of modified formwork costs. Cost of shifting formwork (from site to yard and vice versa) to be borne by the project.

13. Modification vendors will assemble the FW at site and also will provide the assistance to the civil contractor for the first two repetitions. Cost of transfer of material to and fro from CFY to sites shall be borne by Projects and entered under relevant plant head.

14. Civil Contractor at site shall be responsible for returning the Formwork in clean and good condition to the CFY. Formwork that is not cleaned of sticky concrete material will be notified by the CFY controller and deductions will be effected at Rs 270 per sqm. In case of loss of material, the deductions will be made based on the Purchase Cost. Site CM shall be responsible to fill the Pre–Dispatch Check List Form to authorize the contractor to deliver the formwork at CFY.

15. For non-repetitive buildings, CFY and CM Teams need to inspect for quality, cleanliness and reconcile the formwork in use at the last typical floor (terrace) and set the guidelines for the contractor for decommissioning & transfer of the assets in a organized manner to the CFY (instead of dumping at CFY)

16. Purchase costs and scrap values are likely to change from time to time. All the associated costs are related to latest purchase costs and scrap values. CFY will declare LCM premium and modified FW costs 2 times a year.

17. COOs, CM – Heads as well as Structural Design associates will continuously emphasize good handling, cleaning, and good storage of formwork to all CM and MM associates.