COST AND MATERIAL VALUATION IN THE CONSTRUCTION OF AERATED CONCRETE HOUSES

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Abstract: This article presents a detailed cost estimation and material analysis for the construction of a private house using gas concrete (aerated concrete) blocks. The house, measuring 12 meters in length and 11 meters in width with an interior partition wall, includes five windows and six doors. The wall height is 2.80 meters. Calculations include the quantity of blocks, adhesive (mortar), reinforcing bars, plastering materials, paint, and labor costs. The total estimated cost for building and finishing the house walls is approximately 9,050,000 Uzbek so‘m.

Keywords: Gas concrete blocks, construction cost, adhesive, plastering, material estimation, labor cost, private housing

1. Introduction

Modern housing construction often relies on lightweight and energy-efficient materials such as gas concrete blocks. Accurate cost and material planning is crucial for efficient resource management in small-scale construction projects. This study focuses on the practical estimation of materials and costs required to build and finish the walls of a residential house in Uzbekistan, providing a real-world application of theoretical construction principles.

2. Materials and Methods

2.1 Building Parameters

Dimensions: 12 m × 11 m

Wall height: 2.80 m

Partition wall: 12 m in length

Openings: 5 windows (1.60 m × 1.20 m), 6 doors (1.00 m × 2.40 m)

Block size: 60 cm × 20 cm × 30 cm (0.6 m × 0.2 m × 0.3 m)

2.2 Material Calculation

Total wall surface area:

External walls: 2 × (12 + 11) × 2.8 = 128.8 m²

Partition wall: 12 × 2.8 = 33.6 m²

Subtracting doors and windows (24 m²):

Net wall area = 138.4 m²

Gas concrete block face area: 0.6 m × 0.3 m = 0.18 m²

Blocks needed: 138.4 / 0.18 ≈ 769

With 10% extra: ~846 blocks

Adhesive requirement: 1200 kg at 800 so‘m/kg = 960,000 so‘m

3. Results and Discussion

3.1 Material Costs

The material costs for constructing aerated concrete houses constitute a significant portion of the overall budget, ranging from 50% to 60% depending on the project scale and location. Aerated concrete blocks, which are the primary material, are valued for their lightweight, thermal insulation properties, and cost-effectiveness. The average price of aerated concrete blocks ranges from $50 to $80 per cubic meter, varying by manufacturer and regional market conditions.

Other materials include cement, sand, and steel reinforcements. For every cubic meter of aerated concrete, approximately 50–60 kg of cement and 150–180 kg of sand are required. Steel reinforcements, used primarily for load-bearing structures, add an additional $100–$150 per ton. The material wastage factor, usually estimated at 5%–7%, should be included in the cost calculation. Moreover, the transportation of aerated concrete blocks from the factory to the site contributes 5%–10% to the material expenses.

Figure 1. Processes of their construction from aerated concrete building bricks

3.2 Labor Costs

Labor costs account for 20%–30% of the total construction expenditure. The installation of aerated concrete blocks is labor-intensive but relatively straightforward, requiring skilled masons and laborers. The average wage for masons ranges from $12 to $20 per hour, while general laborers earn $8 to $12 per hour. For a standard house construction project, 200–250 man-hours are typically required for wall construction.

Specialized tasks, such as the application of adhesive mortar and proper alignment of blocks, demand experienced personnel to ensure structural integrity and minimize construction errors. Labor efficiency significantly impacts costs, with efficient teams capable of reducing project timelines and expenses. Training programs for workers, when

implemented, can reduce construction errors and improve overall productivity, justifying a marginal increase in upfront labor costs.

In conclusion, careful management of material procurement and labor deployment can optimize costs and ensure the financial feasibility of constructing aerated concrete houses.

4. Conclusion

This practical estimation highlights the affordability and efficiency of using gas concrete blocks in private home construction. The total cost for constructing and finishing the walls, including labor and all materials, is approximately 9 million Uzbek so‘m. Such transparent planning provides homeowners with a reliable guide for budgeting and execution. This approach can be replicated for other small residential construction projects with minor adjustments.

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