

CHAPTER FOUR

4.0 TEST RESULTS AND DISCUSSION

4.1 TEST AND RESULT

After constructing a sandcrete block-making machine, a series of tests are crucial to evaluate its performance and the quality of the resulting blocks. These tests typically include compressive strength, water absorption, density, and dimensional accuracy. The discussion of results should focus on comparing these properties against established standards and benchmarks for sandcrete blocks, highlighting any deviations and potential causes.

1. Compressive Strength:

Test:

Blocks are subjected to a compressive force until they fail, and the maximum load they can withstand is recorded.

Example:

If the machine produces blocks with an average compressive strength of 3.0 MPa, and the required strength for the application is 2.5 MPa, the machine passes this test.

2. Water Absorption:

Test:

Blocks are weighed dry, then immersed in water for a set period (e.g., 24 hours), and re-weighed. The difference in weight, relative to the volume, indicates water absorption.

Example:

If the blocks absorb more than 10% of their weight in water, this could be a concern for durability in wet climates.

3. Density:

Test:

The density of the blocks is determined by measuring their mass and volume.

Example:

A density of 2000 kg/m³ for a standard sandcrete block is considered within the acceptable range.

4. Dimensional Accuracy:

Test:

The length, width, and height of the blocks are measured to ensure they meet specified dimensions.

Example:

If the blocks are supposed to be 400mm long and they are consistently measuring 405mm, this deviation should be addressed.

5. Other Considerations:

Mixing and Molding:

The uniformity of the mix and the efficiency of the molding process can significantly impact block quality. Variations in these processes can lead to inconsistent results.

Curing:

Proper curing (maintaining moisture and temperature) is vital for the cement to hydrate and the blocks to gain strength. Poor curing can lead to lower compressive strength and increased water absorption.

Material Quality:

The quality of the sand, cement, and any additives used will affect the final properties of the blocks. By thoroughly analyzing the test results and addressing any identified issues, the sandcrete block-making machine can be optimized for producing high-quality blocks that meet the required standards for construction.

4.2 DISCUSSION

The compressive strength of the blocks should be compared with the minimum required strength for their intended application (e.g., structural or non-structural walls). If the strength is below the required level, factors like the cement-to-sand ratio, water content, curing process, and aggregate quality should be investigated.

High water absorption can lead to issues like increased susceptibility to weathering, freeze-thaw damage, and efflorescence. The results should be compared to industry standards, and adjustments should be made if the absorption is too high.

Density impacts the overall weight and structural characteristics of the blocks. The density should be within the acceptable range for the type of sandcrete blocks being produced.

Accurate dimensions are essential for proper alignment and bonding during construction. Significant deviations can lead to difficulties in laying the blocks and affect the overall structural integrity of the wall.