

## EXPERIMENTAL STUDY ON THE ANALYSIS OF AIR CHAMBERS DEDUSTING

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**ABSTRACT:** The paper describes the experimental tests carried out on an experimental room sedimentation baffle made of glass fiber. Experimental tests were performed on three types of bulk materials of different density and particle size: coal dust, sawdust and lime.

**KEY WORDS:** air, chambers dedusting, dusty air

### 1. INTRODUCTION

Lodging rooms are only used for capturing dust installations using gravity forever [1].

By circulating in a closed space filled with a gas at a very low speed dust particles are deposited and collected in the hopper placed at the bottom.

In Figure 1 is shown schematically such a chamber, where the particles of dust which are due to their weight are subjected to vertical forces that change their path to the walls of the room where the impact of the fall in the hopper base. [2]

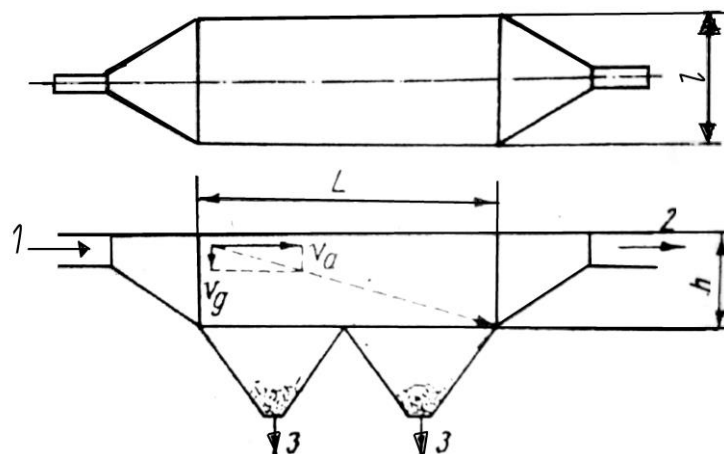


Fig. 1. Diagram of a simple filing rooms:  
1 - dusty air intake, 2 - cleaned air outlet, 3 - evacuation settled dust.

## 2. SIZING

For sizing chamber experimental dusting was done to calculate each component of the system as follows:

- Speaker;
- Confusion;
- Bunkers;
- Baffle;
- Support.

Scheme dedusting chamber design is shown in Figure 2

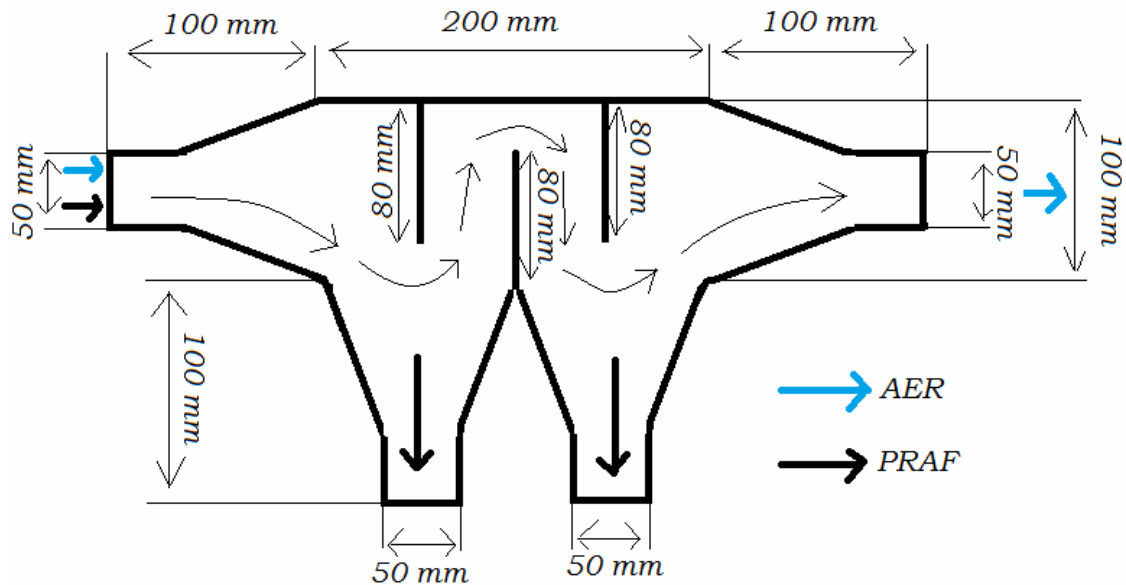


Fig. 2. Room dusting with baffle

## 3. CONSTRUCTION

For making dust control room and used the following materials:

- Glass fibers;
- Resin;
- Hardener;
- PVC pipe;
- Wooden slats;

The first step in the construction of the experimental facility consisted of

transposing the geometric dimensions of each component on the sheet of fiberglass, followed by stages of cutting, assembling parts of the experimental system.

The experimental plant was placed on a wooden support, and to prevent adverse action of UV rays.

This was coated according to the technical standard colors (Figure 3).

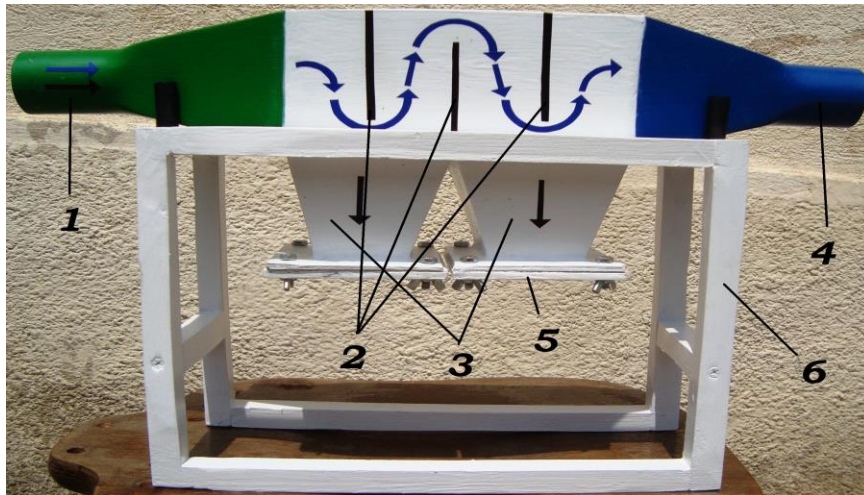


Fig. 3. Experimental dusting room

1 - Speaker, 2 - baffle, 3 - bunkers, 4 - confusion 5 - exhaust flaps, 6 - wooden stand.

#### 4. THE EXPERIMENTAL

Dust control experimental tests were

carried out using 3 density bulk materials, compositions, and different particle size.

These materials (Fig. 4) were:

- Sawdust;
- Coal dust;
- Lime powder.



Fig. 4. Powder material used in the experimental tests

Dust removal efficiency of the experimental system for the three tests were calculated using the formula:

$$\eta = \frac{M_i - M_{f(1,2,3)}}{M_i} \cdot 100 [\%] \quad (1)$$

where:  $\eta$  - efficiency dedusting [%];

$M_i$  - initial mass of dust introduced into plant sprayer;

$M_f$  - retained by the filter final table brought exhaustive;

The results obtained from experimental tests is shown in Table 1.

Tabelul 1. Rezultatele obținute în urma măsurătorilor

Nr. Crt.	Powdery material	M <sub>i</sub> [g]	M <sub>f</sub> [g]	Duration dusting [s]	Dust removal efficiency η [%]	Average yields of the three test [%]
1.	Sawdust	50	0,22	10	99,56	99,48
2.	Lignite dust		0,22	20	99,56	
3.	Lime dust		0,33	30	99,34	

## 5. CONCLUSIONS

• Dust control experimental tests were carried out using 3-density bulk materials, compositions, and different particle size;

• Experimental dusting chamber may retain a percentage of 99.48%, but the yield decreases with increasing amount of dusting powders reaching a rate of 45-55%.

## 6. REFERENCES

[1]. Voicu V. *Air dust removal technique*. Technical Publishing House, Bucharest, 1988.

[2]. Ursu P., Frosin D., Bergea-Tatu I., Popa D., Frosin-Rada D. *Protection of atmospheric air*. Technical Publishing House, Bucharest, 1978.