# Department of Building Egineering

## EXERCISE No. 5

## Cement
**Preparing mortar and bars for testing their mechanical properties (flexural and compression strength)**

# 1.0. Preparing mortar and bars for testing their mechanical properties (wg PN-EN 196-1)

**Equipment and instruments**

- **Laboratory mixer** with adjustable speed;
- **Shaker** – one time shake per second; the total number of shake should be 60;
- **Mold** for cement bars (Figure 1);
- **Climatic chamber** for the maintenance of high humidity (over 90%) and temperature of 20.0 ± 1.0°C;
- **Water container** to store bars without mold.

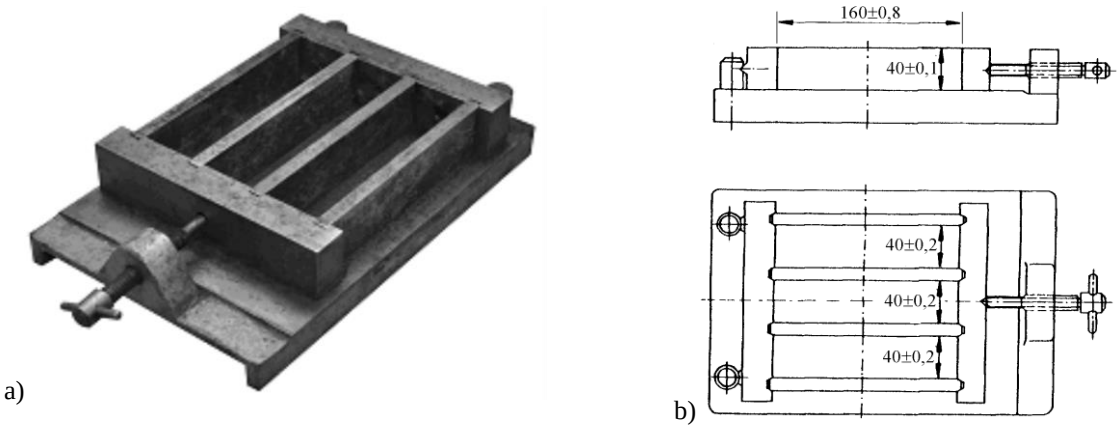


*Fig. 1 The mold for preparing bars: a) general view; b) schema and dimensions*

**Preparing the mold** - thoroughly clean and connect elements, the inner surfaces of the mold should be moistened with mineral oil. Then fill with the mortar.

**Standardized mortar** for the preparation of bars should be made in the following proportions:
1 part of the cement,
3 parts of the sand,
half parts of the water (water-cement ratio W/C = 0.5).

**Standardized mortar** (for three bars) consists of:
450 g ± 2 g of cement;
1350 g ± 5 g standardized of sand;
225 $cm^3$ ± 1 $cm^3$ of water.

**Should do following steps:**
Pour in water the bowl of the mixer, then pour cement, and after mixing gradually dispense the sand.

**Preparing the bars**
From the prepared mortar take the first from two batches of the mortar (approx. 300 g) and fill it to the each partitions mold. The first layer must be thicken on a shaker. After stopping the shaker (60 shocks), must be begin fill a second layer of mortar. Then restart the shaker (60

shocks). Then remove the mold from the shaker and must be remove excess mortar sharp metal ruler.

**Ripening of the bars**

The mold with the fresh mortar should be placed in a climatic chamber. The mold must be covered from the top by plate of glass or steel.

The bars designed to test must be removed from the mold after 20 ÷ 24 h.

The elements must be permanently marked on the surface and put in water with a temperature of 20 ± 1°C. The bars should be kept in water until testing.