Determination of Workability and Strength.

The workability in terms of flow and compressive strength were studied in accordance with ASTM C230-08 [24] and ASTM C 109-11 [23], respectively. The specimens cured in water were tested for 7, 14 and 28 days for compressive strength test. Three specimens were tested to obtain the average value for each test condition.

Results and Discussions

Morphological Structure of POFA.

The morphological structure of POFA sample was examined using Field Emission Scanning Electron Microscope (FESEM) technique. A typical electron micrograph of the ash is shown in Fig. 2. It can be seen from the figure that the particle of POFA generally spherical, but also consists of irregular, thinner and crushed particle [11,12].

![Scanning electron microscope of POFA](image)

Figure 2. Scanning electron microscope of POFA

Workability of mortar.

The level of workability of all mortar mixes is illustrated in Fig. 3. It can be seen that the flow values for OPC is 140mm and for POFA replacement levels of 60, 80 and 100% by weight are 110, 100 and 90mm, respectively. The result shows that higher replacement of cement with POFA required higher water demand compared to OPC mortar. Furthermore, this is due to the fineness particle of POFA that have larger surface area [25].

![Flow result of high volume POFA mortar](image)

Figure 3. Flow result of high volume POFA mortar