STACK MONITORING: CHALLENGES & DIFFICULTIES

Sonal Kumar
20 December 2017
**Sampling Location**

- **Location of sampling port:**
  - 8 times the chimney diameter from any obstruction in the bottom
  - 2 times the chimney diameter from the stack exit
  - practically not possible.

- **Usually, sample is collected at a height of 30-40 feet**

**Diagram:**
- Diameter at top: ~3 feet
- Height: 90 feet
- Diameter at bottom: 10–14 feet
Sampling Location

- Sampling port, platform, guardrails, stair/ladder
  - are not provided in several of the kilns
  - In case provided, size of platform (2-3 person and equipment) and support railings are not adequate in majority of kilns
- Alternate arrangement need to be made
  - Hole in chimney wall
  - Bamboo scaffolding and platform
  - Involves additional cost and time (2-3 days) for preparations
SAMPLING LOCATION
SAMPLING LOCATION
**Sampling Location**

- Absence of power supply or reliable power supply to power the equipment
  - DG set need to be arranged
- Arrangements need to be made for lifting of equipment to the sampling platform
  - Pulley arrangement
- Sealing of port hole
MEASURING VELOCITIES FOR ISO-KINETIC SAMPLING

• Difficulty in measuring low velocities
  – Less than 2 m/s

• Traverse points and Number of port holes required
  – Diameter at sampling port > 2 m; ideally 4 port holes required.
  – Practical difficulty in taking measurements at all traverse points.
Sampling Duration

• Intermittent fuel feeding in brick kilns
  – 10-15 minutes of feeding followed by 15-30 minutes of non-feeding
  – Fluctuations in fuel feeding also results in fluctuations in emissions

• Sampling duration should be 45 min to 60 min
  – To capture both feeding and non-feeding periods
  – Too long duration will create difficulties
    • condensation of moisture
    • Increased suction requirement because of dust accumulation on filter
CONCENTRATION OF $O_2$, $CO_2$ AND $CO$ OVER 75 MINUTES PERIOD IN A FCBTK
**MONITORING OF FUEL FEEDING**

- Simultaneous monitoring of fuel feeding also required
  - To keep track of feeding and non-feeding durations during the sampling
  - To track the quantity of fuel fed
LOCATIONS OF SIMULTANEOUS MEASUREMENTS
Flue Gas Analysis

• Flue gas analysis should be done simultaneously
  – To measure CO$_2$ composition in flue gases
    • required for normalisation of the measured emission value
  – CO values from the flue gas analysis also give indications about the quality of combustion
**Flue Gas Analyser**

- It is used to measure the concentration of various components in the flue gas like CO$_2$, CO, O$_2$, etc.
- Electrochemical sensors are used for measurement of O$_2$ and CO concentrations.
- CO$_2$ concentration is measured by infrared detectors.
- Also has a thermocouple to measures the temperature of flue gas.
THANK YOU !!!

Contact: Sonal Kumar
Email: sonal@gkspl.in
Mobile: +91 9971447171