DPF-Quality in Swiss Construction Sites

Control of Filters in the Field

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1. Main emissions sources / Construction Sites in Zurich
2. Legislation / History
3. Procedure and Focus of Controls
4. Results of Canton and City of Zurich
5. Experiences / Information campaign
6. Further steps
Main Emission Sources of PM10

- Industry & Labor (construction sites)
- Wood-fired Installations
- Traffic (heavy duty vehicles)
Canton of Zurich – City of Zurich
Construction Sites – Distribution of High Priority Sites

Red: Building construction
Blue: Civil engineering
Canton of Zurich – Controls of Construction sites

- Construction sites in the responsibility of municipalities (169)
- Cantononal database, few data due to limited resources
- External resources (air / noise / water and soil protection) available for municipalities: (BUC = Construction site Environmental Controlling), frequency of use?
- Canton of Zurich controls construction sites in its own responsibility
- Mainly sites of civil engineering (roads, public transport infrastructure, etc.)
- Financial penalties for non-compliance with the DPF-regulations (2008)
- Communication with construction industry
Legislation: Clean Air Action Plan 2011, City of Zurich, Measures in our own Responsibility

City Administration, Diesel engines > 50 hours/year:

- Diesel engines on construction sites of the City
  Limite value for particle number
  > 18 kW
  \(1 \times 10^{12} \text{ 1/kWh}\)

- Accepted are registered DPF (FOEN-filter liste)
  or equivalent systems with certificate of conformity
  as specified in OAPC.

- Same regulation for diesel engines
  in agriculture and forestry
Construction Site Inspection – Equipment
Stages before control:

1. Approval contains strict invitation to contact our office (high priority sites)
2. Visit of the responsible person (construction site management) in our office. Information on the construction project have to provided (machine and engine list, timetable, declarations)
3. Construction permit after fulfillment of these conditions
1. **Main focus on DPF**

- present
- functional (measuring not yet possible)

**Visual control:**
- blank tail pipe inside?
- handkerchief soot test
- cloud of smoke at start / under free acceleration
- Datalogger filter monitoring
2. **Exhaust Maintenance**

- Exhaust Sticker
- Exhaust Maintenance Document

**Visual control:**

- Installation Certification / Identification DPF
- Exhaust Maintenance Document (Engines > 18kW)
- Engine Maintenance: Exhaust Sticker

*The Maintenance is to update every 24 months!*
3. Dust Emissions

Visual control:
- Material displacement
- Material break
- Material processing and treatment
4. After the inspection

- Written report to site management and company (evtl. to customer),
- If necessary: (urgent) measures: perform maintainance, retrofit DPF, dislocation of machine etc.
- Follow-up control (with bill)
Results / Canton of Zurich – Controls in a Company

- 23 machines measured
- 4 machines with malfunction in the DPF
- 1 machine without DPF
- 1 machine with emission concentration of 160’000 P/cm³

Results show correspondence to the results of visual inspections in the field.
Canton of Zurich – Results of inspections

Graph showing the number of vehicles inspected and the percentage of rejected vehicles from 2006 to 2015.
Construction Site Inspections, City of Zurich 2008 - 2015

Number of Vehicles

%
Experiences

- High Effort in introducing of new measures (for operator/owner and administration)
- Problem of NO$_2$ (f.ex. CRT-Systems)
- Control costly - Enactment still too federally (resources, priorities)
- DPF established on our construction sites
- Use of von alcylate fuel has proved its worth
Information Campaign “Znüni-Bus - Good Air on Construction Sites” (2011)

Snack + informations for 20 minutes during break on construction sites
Most important Cause of Complaints: Mineral Dust
Further steps

- Further promotion of DPF – according to our own possibilities
- Promote use of electric-powered equipment
- Implementation of particle number measurement
More Informations

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Thank you for your attention!