

Dust Monitoring System / 粉尘监控系统

Measuring particulate matter: accurate and quick
测量颗粒物：精确和及时

Exposure to particulate matter in the air is a persistent environmental problem. Inhalation of fine particles has negative effects on health and life expectancy.

暴露在空气污染物下是一直以来的环境问题。吸入微细颗粒对健康和寿命都有着负面影响。

Fugitive material is one of the sources of particulate matter. One example is dust that is released into the air by activities at industrial sites such as storage and transshipment terminals. Sometimes, boundary values are exceeded locally, causing hindrance for the surroundings.

逸散材料是颗粒物污染的来源之一。比如说在工业用地的存储和转运码头的活动就会释放粉尘到空气中。当排放超过边界值时，会对周边环境造成影响。

Up to now, measuring particulate matter in this kind of situation was only possible with costly equipment. Moreover, the experts needed to interpret the measuring data, for example to determine the source of the emissions. ECN's Dust Monitoring System has changed this situation.

到目前为止，能在这种环境下对颗粒物进行测量的仪器都十分昂贵。此外，还需要技术专家们对测量数据进行分析解释，比如说用来确定排放的来源。ECN的粉尘监控系统则改变了这种状况。

What is the Dust Monitoring System? / 什么是粉尘监控系统

- A complete measuring network for continuous, real-time measuring of particulate matter at a specific location.
- 一套完整的用于在特定位置进行连续、实时测量颗粒物的监测网络
- Easy: no need to worry about installation, operation and management.
- 简单操作：无需担心安装、操作和管理
- Determining the source location and source emission by linkage to a distribution model.
- 通过链接各分布模块来确定排放情况和位置
- Alarm function in case of high concentrations of particulate matter, enabling intervention.
- 在高浓度颗粒物情况下会有报警功能以便采取干预措施
- Reports suitable for internal use and for justification towards the competent authority.
- 生成的报告可供内部使用或作为依据呈交给主管机构

Example of application: Coal transshipment / 应用实例：煤炭转运

The Dust Monitoring System has been used at a coal transshipment terminal in the port of Amsterdam. Eight sensors have been installed that visualise the amount of fugitive dust, online and real-time. ECN processes the measuring data and offers them in a clear report to the manager of the site.

粉尘监控系统已被用在阿姆斯特丹港口的一个煤炭中转站。在该系统中8个传感器被用来对扬尘量进行可视化在线实时监测。ECN对测量数据进行分析并给现场的管理负责人提供一份清晰的报告。

A dispersion model is used to determine which part of the emissions originates from the coal transshipment terminal. This enables monitoring, signalling and intervention in processes in case of undesired, high concentrations of dust. Based on continuous annual measurement, the annual emission load can be calculated.

在该项目中，一个扩散建模被用来确定哪一部分的污染排放物是来源于该煤炭中转站的，从而可以在不理想高浓度粉尘环境下进行监控、发出信号和对其进行干预。此外基于每年连续测量数据可计算出年排放量。

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Simple, but accurate sensors / 简单却精确的传感器

Particulate matter sensors measure the dust in the air based on scattering of light caused by dust particles. ECN has developed its own algorithm for reading out these sensors. The accuracy has improved so much that trends and spatial variation can now be mapped. With the sensors, a larger spatial coverage can be achieved compared to traditional measuring equipment.

颗粒物传感器通过灰尘颗粒上光的漫射来测量空气中的粉尘情况。ECN自己开发有算法来读取传感器上的数据。由于精确度有了很大的提高从而可以预绘出空间和时间变化趋势。相较传统测量装置，这些传感器使得大空间范围的测量可以得到实现。

Dispersion model for source determination / 用以确定来源的扩散建模

In the dispersion model, measurement data are combined with meteorological data. This way, the model calculates the location and emission of the particulate matter source. Hence, it is possible to establish if the particulate matter indeed originates from a monitored location and, if needed, to further specify the location at the site. Moreover, model results can be linked to the activities at the site, such that it can be established if the emission peaks coincide with certain activities.

在扩散建模中测量数据与气象数据相结合。通过这种方式，该建模可计算出颗粒物的排放和位置从而判定这些颗粒物是否真的来源于监测地区。如果真来自监测地的话可进一步确定具体位置。此外建模数据还可用来链接现场实际行为从而可以建立比如说颗粒排放量达到高峰与某些活动之间的关联。

Signalling when boundary values are exceeded / 超出边界值时发出信号

The Dust Monitoring System continuously measures the concentration of particulate matter in the air. It is therefore easy to quickly determine on site if boundary values are being exceeded. If needed, the system will send a signal to the site operator, who can then take measures to minimise hindrance. The registration of activities at the site can be linked to the Dust Monitoring System, for example through a log. This way, it can be monitored to what extent specific activities contribute to the emission of particulate matter.

粉尘监控系统可以连续测量空气中的颗粒物浓度情况，因此它能很容易迅速判断测量区域是否超过边界值。如果需要的话，该系统将会给现场操作人员发信号以备采取措施减小影响。此外，比如说通过日志记录，现场活动行为可与空气监测系统链接从而可监控这些行为引发的相应颗粒物的排放程度。

Clear reporting / 清晰的报告

The system processes the measuring data into a clear report, containing information on the development of concentrations over time and the location and emission of sources at the site. The information contained in the report is suitable for internal use, for example to arrange company processes such that hindrance is minimised. The information is also suitable for reporting to the competent authority.

系统处理测量数据后生成一份清晰的报告，其中会包含随时间而变化的浓度情况以及现场排放和排放位置等信息。这份报告可供公司内部比如说用来重新安排活动进程以改善情况。报告也可以用来呈交给主管机关。

Flexible system enables other applications / 可结合其他应用的灵活系统

By installing additional sensors (nitrogen, ozone) and adjusting the information that is generated, other applications are also possible. Examples include the measuring of air quality in cities, in production halls and in offices.

通过安装其它传感器（比如说对氮气或臭氧的测量）和修改生成的信息，系统装置也可以应用在其它方面。比如说对城市、生产车间或办公室的空气质量测量。

