C29 Update on Dust Particulate Analysis From the World Trade Center Disaster of September 11, 2001

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The goal of this presentation is to provide an update 10 years later to the forensic community on the microscopical analysis of dust particles from the World Trade Center Disaster of September 11, 2001.

This presentation will impact the forensic science community by showing how forensic microscopical studies display the differences between WTC dust and other dusts from other sources in indoor environments thereby helping to provide the scientific information necessary for judicial decisions.

After the September 11, 2001 attack on the World Trade Center buildings in New York City dust samples were collected from a variety of locations both inside and outside of buildings. Microscopical analysis of dust samples showed that the dust was composed primarily of construction debris containing glass fibers, plaster and cement particles as well as soot, wood particles, paper, and cotton fibers.[1-3] Similar findings have been published by the U.S. Geological Survey.

Based on a number of samples and a number of different types of analyses, the general composition of the WTC dust was found to be:

- Glass fibers (primarily mineral wool) - 35 – 40 %,
- Gypsum particles - 25 – 30 %,
- Cement/Calcium-containing particles - 10 – 15 %,
- Cellulose (paper, cotton, wood fibers) - 5 – 10 %,
- Combustion Products (soot and char) - 1 – 10 %,
- Crystalline Silica ~ 6 %,
- Asbestos (primarily chrysotile with some amosite and tremolite) - < 1 – 2 %,
- Other Material Classes (paint, metal, vermiculite, glass shards) - <1 % per class.

Elongated particles of calcium/sulfur/silicon were also found. The source of these particles has not been determined. They may have been generated from wallboard gypsum and ceiling tile mineral wool under high temperature conditions.

All the classes of components in the WTC dust have been found in other residential and office dust samples but the population of small particles containing a combination of a high amount of glass fiber, a high amount of construction debris material (plaster/cement) and obvious presence of combustion product particles (both char and soot) serves as a distinguishing characteristic of WTC dust when compared to most typical residential or office dusts. Pieces of asbestos large enough to be seen with the light microscope are also a characteristic of some WTC dust samples because large asbestos particles are not seen in normal building dust samples. With the exception of the elongated calcium/sulfur/silicon particles, all the types of particles in the WTC dusts have been reported as associated with normal dusts. At this time, no single particle type is accepted by the scientific community as a signature particle for WTC dust.

References:

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WTC, Dust, Microscopy

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