

STUDY ON DUST HAZARDS AND PREVENTIVE MEASURES IN MODERN LARGE SCALE PETROCHEMICAL ENTERPRISES

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Presently, it is reported at home and abroad, whether there is harm of dusts in modern large petrochemical industries. Our country's petrochemical industries will develop greatly with the vigorous development of our country's oil resources. We had found the problem of dust pollution in processes when testing in a chemical synthetic fibre company before it went into operation. In order to look into dust hazards and preventive measures, we had made investigations and experiments on the dust hazards of this company's polythene, polypropylene and nylon-66-salt, etc., three workshops, from 1983 through 1986.

LABOUR HYGIENIC INVESTIGATION

That company is a new large petrochemical synthetic fibre cooperation company. Major productive equipment was all introduced from abroad. Polythene, polypropylene and nylon-66-salt were put into production in 1981. Dust concentration is relatively high in the air of polluted spot by dust, when adding auxiliary dosage in stable post of polythene $3.4\text{--}619.3\text{ mg/m}^3$, adding auxiliary dosage in stable post of polypropylene $0.7\text{--}67.5\text{ mg/m}^3$, putting them in mother feed jar $3.4\text{--}13.3\text{ mg/m}^3$, at the head of a continuously mixing machine, $2.6\text{--}78.8\text{ mg/m}^3$; in front of the packer of nylon-66-salt $48.7\text{--}157.3\text{ mg/m}^3$.

The free silica content in three dusts have not been detected by mini-X-ray diffractometer. Those (their dispersities are less than $5\text{ }\mu\text{m}$) are up to 84.5%–99% by using Glyn's subsidence.

A HEALTH CHECKUP OF DUST EXPOSED WORKERS

We checked about 600 workers for dust exposure in three workshops. Other workers had been found with special changes; besides, these workers of nylon-66-salt had been found to have symptoms of conjunctive stimulate.

ANIMAL EXPERIMENTS

We divided randomly wistar 250 rats with weight 170–210 mg into polythene, polypropylene, nylon-66-salt, quartz control and physiological salt water control etc., into five groups. 50 mg/ml dust mixed-liquid made by polythene, polypropylene was poured into trachea one time. Nylon-66-salt with simulations scene condition through trachea was spouted to lungs 50 mg, observed a year and

half. We observed pathological change and measured content of collagen protein of total lungs. Result of polythene, polypropylene has a light fibering effect; fibering of polypropylenes is more than one of polythene; fibering affect of nylon-96-salt dust is not evident.

POISON TEST OF MACROPHAGUS

We chose New Zealand rabbits with weight of 2–3 kg and killed them by bloodletting on abdomen aorta, collected macrophagus of pulmonary alveolus for training by Myrivk's method. We classified polythene, polypropylene nylon-66-salt, quartz and control into five groups by observing colouration rate of macrophagus and vitality of lactate dehydrogenase. Result is that all of three dusts have some effect

DISCUSSION

Through investigations of three workshops, it is denoted that there are problems of dust pollution in modern large petrochemical industries. Major cause is irrational productive technology and defects in equipment. Stable post of productive route of polythene, polypropylene, due to man hand-work, adding auxilliary dosage, brought about an opening operation in continual production. Productive route of polypropylene is conveyed by mother feed jar after adding auxiliary dosage. Nylon-66-salt after water comes off dried by air flow in carrying pipe, due to shortage of heat preservation on separate equipment; it easily coagulates in it. Workers were compelled to heat equipment frequently or to add vibration installation on equipment, having to put original air tight tie into soft tie, which resulted in destruction of air tightness of equipment. Next is short of necessary ventilator protective equipment

Results of experiments show that polythene, polypropylene dusts all have tight fibering effect on lungs of rats and Nylon-66-salt dusts have certain injury to trachea of rats. Therefore it is considered that long-term exposure of workers to the above mentioned dusts of high-concentration have affected workers' health.

According to results of spot investigations, it is considered that to solve dust hazards in the above-mentioned production process, one needs to eliminate opening productive links and to realize through air tightness products, not to ignore needful ventilation dust-proof equipment at the same time.

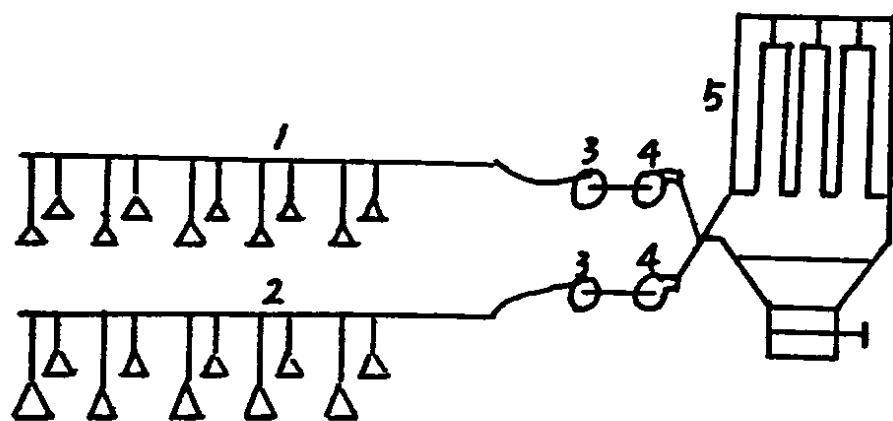


Figure 1. A ventilated dust-proof and dust-removing system in the perlite mine.

- 1-2. ventilating pipes
- 3. cyclone dust remover
- 4. ventilator
- 5. simple cloth pocket dust chamber

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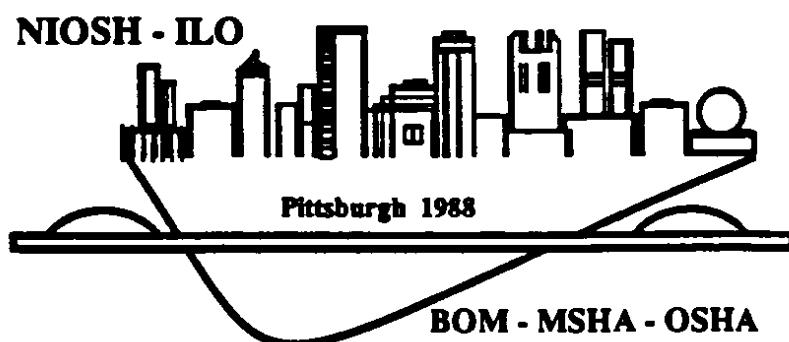
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