

CEFINEA'S SCIENTIFIC PROGRAMME FOR THE MODELLING OF AIR POLLUTION IN HO CHI MINH CITY

Ho Quoc Bang & Catherine Brassaud

The increasing air pollution in Ho Chi Minh City (HCMC) is worrying the authorities and competent organisations in this field. Official pollutant limits are frequently exceeded; for instance, peaks of SO₂ of 0.743 mg/m³ have been recorded in 2001, while the Vietnamese standards set for SO₂ are 0.5 mg/m³.

The main sources of atmospheric pollution are vehicles (motorbikes) and the industry. In the busy streets of HCMC, 2'000'000 motorcycles and 250'000 cars were counted at the end of 2001, for a population of approximately 5 million people in an area of 2'093.7 kilometre square (that is about 2'400 persons by kilometre square!). Out of HCMC's 943 streets, 60 major traffic jams locations have been identified, by far the greatest cause of air pollution in the city.

According to the HCMC's general statistics office, there are about 28'500 factories in the city (including 700 medium- to large - scale enterprises), distributed in ten industrial zones and two export processing zones, producing a total of 60'128 tons per year of SO₂, 15'295 tons per year of NO₂ and 1'539 tons per year of CO. Among them, the most polluting are the industries of textile and dyeing, concrete, thermo-electricity and food-processing (see table 1), as well as cement plants, steel mills, fertilizer plants, chemical factories, rubber processing plants and the tobacco industry.

Targeting a better management of traffic and the control of air pollution,

the Institute for the Environment and Resources (CEFINEA) of the Vietnam National University - HCMC created in 1996 its Department of Air Pollution.

Given the task of implementing the National Environmental Monitoring Program for HCMC and the Mekong Delta area (with the cities of Long An, My Tho, Can Tho, Ca Mau and Moc Hoa), the CEFINEA's Department of Air Pollution started intensive data collection with its mobile and automatic air monitoring station fully equipped for the analyse of SO_x, NO_x, CO_x, Pb, HF, HCl, NH₃, H₂S and THC taking into account meteorological parameters such as wind speed and direction, humidity, temperature, solar radiations and air pressure. At this stage, the air quality network in HCMC includes four ambient air monitoring stations, five roadside monitoring stations and two urban background monitoring stations.

Some of the best CEFINEA's scientists were sent abroad for training in this field: among them, Mr Ho Quoc Bang who just started his MSc in Environmental sciences, engineering and management at the Swiss Federal Institute of Technology, Lausanne (EPFL).

Involved in a cooperation project with the Swiss EPFL, the CEFINEA is currently starting -- through Mr Ho's MSc -- a new scientific programme entitled "Modelling of air pollution in HCMC area and proposal of environmentally friendly traffic regulations".

Mr Ho will work in close collaboration with EPFL's Air and Soil Pollution Laboratory (LPAS), where he will carry out his research project under the supervision of Dr Alain Clapp Institute for Environment and Resources and Mrs Erika Zarate, doctoral student, developing a similar research programme for the town of Bogota, Colombia, South America.

Mr Ho's research, designed to be the starting point of the bigger programme for the modelling of air pollution in HCMC, will be dedicated to the inventory of sources of air pollution in HCMC, the analyse of pollutants and the

assessment of different models for the modelling of air quality. Then, additional research work and significant financial support will be needed to purchase and validate the model.

While being a very performing approach, modelling of air quality is costly in terms of manpower and finances. But, resulting from the Vietnamese expanding economy, the issue of air pollution in HCMC and other big cities in Vietnam needs be taken seriously, for it may induce serious environmental and human health problems in the long run.

Table 1

Air emission inventory of some major industries in Ho Chi Minh City (ton/year)

<i>Industries</i>	<i>SO₂</i>	<i>NO₂</i>	<i>CO</i>
<i>Thermo electricity</i>	48,082	14,042	563
<i>Steel refine</i>	897	131	3,104
<i>Acid production</i>	420	35.7	1.4
<i>Concrete</i>	5,589	854	23
<i>Plating</i>	28	4.3	
<i>Rubber</i>	80.1	13.46	
<i>Textile and dyeing</i>	1,128	172.4	4.8
<i>Mechanism</i>	102	15.4	0.56
<i>Food processing</i>	1,120	257	15
<i>Beverage</i>	140.4	22.2	0.81
<i>Plastic be ton</i>	66.7	5.3	13.3
<i>Wood processing</i>	39.5		
<i>Brick and tiles</i>	12.8		
<i>Prochelain and ceramic</i>	0.98	4.91	1.97
<i>Glass</i>	919	257	11
<i>Paper</i>	83	13.4	



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Prof. Dr. Lam Minh Triet

Phone : 84 8 865 1132, Fax: 84 8 865 5670, Email: qln-ho@vnunhcm.edu.vn