

# Indoor Environment Quality at Schools: A training project of the students and teachers in İzmir (Turkey)

A group of researchers have teamed up with Chamber of Mechanical Engineers – İzmir Branch (CME-IB) to conduct a project to raise awareness on the importance of indoor environmental quality (IEQ) for children. School children and school IEQ were the targets, which lead to inclusion of teachers and school managements among the targets of the project. Primary and middle schools in the metropolitan İzmir were chosen as the main targets and the backing of Ministry of Education İzmir Directorate was obtained. There are 150 schools in the target area with roughly 30,000 students, 2,000 teachers and managers, therefore, only the 8<sup>th</sup> grades were selected for the first year.

Guidebooks for all six components of IEQ (indoor air quality, thermal comfort, acoustics, lighting, odour, and vibration) and guidebook for risks of school materials, cleaning and personal care products were written for teachers and management. An overall guidebook entitled “Indoor Environmental Quality” was prepared for students by putting together and simplifying the seven guidebooks and adding a part on health effects of IAQ using simple illustrations drawn by a renowned caricaturist. **Figure 1** shows the cover page of the guidebook.

Seminar lectures with slides were prepared that cover all aspects in the IEQ guidebook to be given at schools by volunteer professional mechanical engineers. The volunteers were scouted by CME-IB by issuing a call to

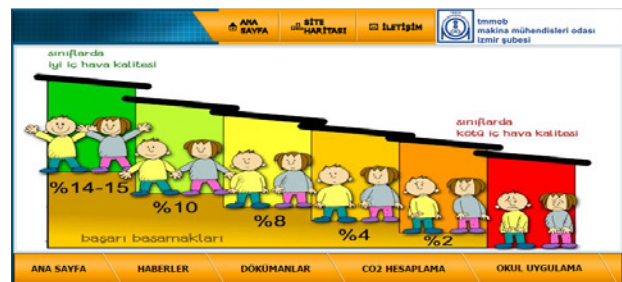
**Figure 1.** Front cover of the IEQ Guidebook.



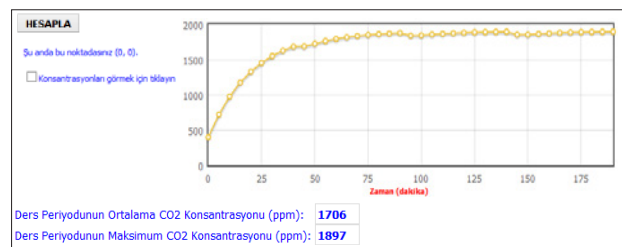
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member engineers who have school-aged children. Fifty-two volunteers were trained by the researcher’s team. The volunteers visited the schools according to a schedule made by CME-IB. Twentysix schools were visited, 48 seminars were given to 5,066 students and 325 teachers by the end of 2015 spring semester.

A website was constructed to make all the prepared guidebooks and presentations available to the public. Homepage of the website ([www.iccevrekalitesi.net](http://www.iccevrekalitesi.net)) is shown as **Figure 2**. In addition to the documents, this website has a section for a computer program prepared as an illustrative calculation tool to show children and teachers how fast can IAQ in a classroom can worsen using CO<sub>2</sub> as an example (**Figure 3**).



**Figure 2.** Homepage of the information dissemination website.



**Figure 3.** Output of the CO<sub>2</sub> modelling tool.



**Figure 4.** The fitted heat recovery ventilation unit in a classroom and the IAQ team made up of students and the teacher.

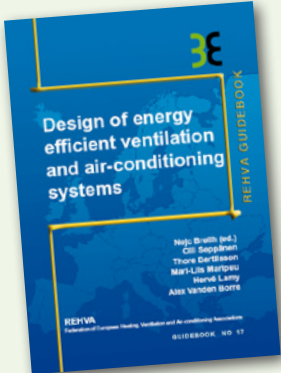
The tool may also be used by HVAC engineers to determine a ventilation rate that would keep CO<sub>2</sub> concentrations below a standard level.

The third leg of the project was installation of a mechanical ventilation system at an application school. The aim of this task was to show the school managers and the officials of the Ministry of Education that indoor air quality problems can be mitigated by fitting energy efficient mechanical ventilation units to existing naturally ventilated schools. A school in the metropolitan area was selected. It is located in a disadvantaged area where pollution from traffic and nearby industries and SMEs may be a problem. The existing conditions

in the application school in terms of IEQ have been investigated in Fall-2014 semester; and was repeated after the installation in Spring-2015 semester. IAQ variables (particulate matter, volatile organic compounds, carbon dioxide) and comfort variables (temperature, relative humidity, illumination) have been measured. The ventilation system has been designed, manufactured, and installed a classroom of the school in the January semester break. Figure 4 shows the classroom and the IAQ team that actively involved during the measurements. It has been shown that CO<sub>2</sub> concentrations in this classroom of 30 students can be kept below the British Department of Education Building Bulletin 101 standard levels. ■



## REHVA Guidebook on Design of energy efficient ventilation and air-conditioning systems



This Guidebook covers numerous system components of ventilation and air-conditioning systems and shows how they can be improved by applying the latest technology products. Special attention is paid to details, which are often overlooked in the daily design practice, resulting in poor performance of high quality products once they are installed in the building system.