Using Google Earth to improve workplace conditions

GPs in one of France's most heavily industrialized regions can check on their patients' working environment using Google Earth. But finding the link between illness and work is just the first step in an approach that ultimately aims to make harmful workplaces healthier.

The Mediterranean industrial zone of Fos-sur-Mer/Martigues lying forty kilometres west of Marseilles is home to a wide range of industrial activities (iron and steel making, oil refining, basic chemical manufacturing, quarrying, etc.) that make it a key vantage point for monitoring the health effects of work.

The *Association pour la prise en charge des maladies éliminable* (APCME), an association set up in 2000 by GPs to tackle eliminable diseases, has developed a computer-based aid to support or disprove the suspicion that a diagnosed illness has been caused by work. The association's very name reflects a view that occupational diseases are not a horrid inevitability.

"We talk about 'eliminable diseases' because the term 'occupational disease' implies that doing a particular job necessarily entails developing particular diseases, when in fact they can now be avoided and eliminated", argues APCME coordinator Marc Andéol.

The project's underlying idea could not be simpler: to provide all doctors in the region with data on all cases of diseases where there is a proven link with the work environment.

Practically, a GP who suspects that health damage diagnosed in a patient has a work-related cause can call up all similar cases diagnosed by fellow association members on an Intranet site.

More specifically, the system returns two types of data: proven cases of occupational disease ("Case Gallery") and workplaces associated with those cases ("Workplace Gallery").

Simplified example of a Case Gallery record
Patient record for case No. X

1. Clinical findings:
recurrent conjunctivitis and eczema, back pain

2. Dated list of jobs:
2002: Martigues, tanker driver (employer X)
2007: same job

3. Selective list of workstations:
- Enterprise A, heavy goods loading
- Enterprise B, chloroform filling
- Enterprise C, heavy goods loading
- Enterprise D, lubrication circuits feed

4. Summary list of risks FROM:
- First group of factors:
  - noise ++
  - heat +
- Second group of factors:
  - mineral dust +
  - trichloromethane vapour (chloroform) ++
  - carbon tetrachloride vapour +
  - vibration (road tractor) ++
- Third group of factors:
  - handling of flexible pipes ++
- Fourth group of factors:
  - painful positions +

5. Network response:
- can the health complaint have an occupational origin? YES, it is listed in occupational diseases table 12;
- to which risks FROM (harmful factors) can this health complaint be attributed? The table cites "halogenated aromatic hydrocarbons", the list of the substances in this family is given;
- are these risks FROM (harmful factors) present in the patient's workplaces? YES, especially for chloroform;
- can the health complaint be attributed to other material, non-occupational factors? NO, especially as the problems appear only during exposure to the risk;
- do other data for similar cases substantiate that the disease is attributable to the risk FROM? YES, but no similar cases are yet recorded in association doctors' patient records.

6. Reporting:
- the person does not wish to report the disease, but wishes the complaint to be recorded and for corrective action taken at the workplace.

Sample "harmful workstation" data sheet
Chloromethane filling

- Actual working area: filling point on road, filling bridge and tanker top (dome).
- What he does: tanker driver/operator. Drives the tanker under the filling bridge, climbs onto the tanker top and opens the dome, goes onto the filling bridge to help the filling operative insert the filling arm into the open dome, climbs back onto the tanker to close the dome once filling has been completed.

Risks OF (proven):
- chronic conjunctivitis and eczematous dermatitis FROM chloromethane (case No. X, 2007).

Risks FROM (priority):
- noise +
- chloroform (trichloromethane) ++

Risks OF (others, probable):
- cancer (chloroform is a suspected carcinogen).

- Local specific characteristics: filling via dome for approximately thirty minutes without IBA (Independent Breathing Apparatus) in an often windy environment (mistral, onshore wind, etc).
- Subcontracting: yes (firm name)
- Alternating work crews: no
- Number of workers per station: 2 (tanker driver/operator and filler)
- Exposure: intermittent
- Risks FROM:
  - cofactor: for the health damage, other risks FROM may be involved (see handling of "heavy goods" under "firm name");
  - occasional carbon tetrachloride filling. See material safety data sheets at www.reptox.csst.qc.ca.
- Background ambient air pollution may be found in this area from:
  - monochloromethane (methyl chloride);
  - dichloromethane (methylene chloride);
  - tetrachloromethane (carbon tetrachloride).
- Other workers, same workstation:
  - similar cases on record: nil;
  - follow-up examinations on record: nil.
- Personal protective equipment:
  - see recommendations on www.reptox.csst.qc.ca. Seem not to be applied.
- Improvement:
  - In progress.

The Case Gallery

A GP who suspects that a patient's ill-health has an occupational cause will create a patient record containing summary details of the clinical findings, a dated list of jobs held, a list of workstations, and a summary list of the hazards that the worker is or has been exposed to. A fifth and final heading, comprising five questions, will help the doctor and his patient decide whether to apply for recognition of an occupational disease (see example of a patient record below). The patient record is accompanied by a "history sheet" describing in detail the tasks performed and the different types of exposure to risk factors.

The Case Gallery contained 730 patient records in February 2008. Around 80 cases a year on average are reported as occupational diseases, with an up-to 85% rate of recognition[1]. Respiratory disorders are the most frequently reported disease (46% of cases), followed by deafness (27%) and cancers (10%). Many patients will present with multiple health problems reflecting multiple exposure to occupational risk factors. "You seldom find people suffering from just one type of health damage", observes Marc Andéol.

The system has also helped to identify two particularly at-risk groups: immigrants, who account for 40% of cases although making up only 29% of the local population, and subcontracted workers, who account for approximately 60% of cases.

The Workplace Gallery

A table is generated for each industrial plant with at least one confirmed case of an occupational disease. Column one contains the name of the workstation and a concise description of the tasks performed, while column two shows the case number recorded in the Case Gallery which enables the doctor to access the patient's individual record sheet. The three last columns track the workstation's status: eliminated, improved or still unhealthy.

A data sheet is also generated for each "unhealthy workstation" comprising four compulsory headings:
- description of the workstation: the worker's maximum working area followed by a description of what he does in practice. The occupation is named only if associated with clearly-defined risks;
- proven risks of disease: particulars of the proven occupational disease followed by cause and case number;
- risks by harmful factors: harmful factors that are material because of their intensity or aggressive nature;
- "highly probable" risks: diseases likely to be found because these harmful factors are present.

The sheet may be supplemented by information on work organization (shift work, staffing level, subcontracting, etc.), the work group's health status and a history of the main changes made to the workstation. This text box area provides much valuable information that very often only the workers are able

[1] An APCME member GP submits an average 4.25 reported occupational disease forms a year, compared to 0.2 for French GPs generally.

to provide, to fill out the particulars given in the compulsory fields.

Google Earth

To help GPs who are not often familiar with actual work conditions in workplaces, the APCME has mapped workstations known to have caused at least one case of a recognized occupational disease. Using the well-known Google Earth program, doctors can fly over the industrial zone and zoom in on a chosen site to view their patient's work environment. The program's "placemark" function allows health-damaging workstations on an industrial site to be identified by a drawing pin icon which opens up a window providing three kinds of information related to the workstation: a short description of it, health damage already recorded for it, and a link to the personal record in the Case Gallery. Ultimately, photographs, drawings or other illustrations may be added to the placemark that will give doctors a more detailed knowledge of their patient's occupation and work environment.

Improving unhealthy workplaces

The system may have been designed and developed to give GPs easier access to information about the hazards of work and so make it easier to get compensation for victims, but the project's main aim is to completely eliminate the hazards. This is because in by far most cases, recognition of an occupational disease does not result in any corrective action on the workstation, which means that the worker's health will only get worse if he stays in the job, or that the next person to take the job risks having the same problems.

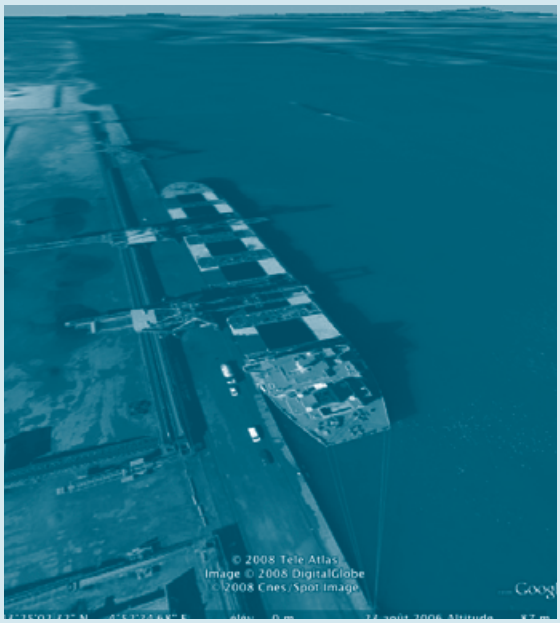
"You might find the odd tear shed for victims, before the next comes along", complains Marc Andéol. It is a vicious circle that needs to be broken. The APCME is trying to set up an "improvement committee" of sufferers, health and safety inspectors, trade union health and safety committee (HSC) reps, and representatives of social security bodies for every unhealthy workplace revealed by an occupational disease.

"It's a tool that has enabled to us to get better account taken of diseases in our firm. You don't necessarily see it when workers are sick, and you don't always make the link with the work environment. The APCME's system has given us some feedback on these work-related illnesses, and allowed us to go out there and do what has to be done to get significant improvements in workstations", says Michel Coste, a workers' rep on the HSC of Fos-sur-mer-based chemical manufacturer Arkema.

"For instance, we had a case of cancer related to a filling station. That prompted us to look at all our filling stations. Workers don't open the domes to gauge the tanks any more. We have got improvements made to workstations which mean that workers – usually subcontractors – are no longer breathing in highly dangerous chlorinated organic materials like vinyl chloride monomer, dichloromethane, trichloroethylene, and so on", the trade unionist is pleased to report.

With backing from the authorities of the Provence-Alpes-Côte-d'Azur region, the APCME is planning to submit a project to the European Union shortly to extend the initiative. ■

Illustration of the use of Google Earth:
coal ships being unloaded at the Arcelor mineral wharf, Fos-sur-Mer



The ship being unloaded by two huge 55-tonne gantry cranes is literally coated in black dust. This snapshot shows large amounts of probably silica-containing mineral ores spilling off from the system used to unload coal from the holds.

Opening record No. X in the "Case Gallery" to which the "list of workstations that have already produced health complaints" links, there is a note that machinery is located at the bottom of the holds which form piles as the coal is unloaded. The men working in the enclosed space of these 20-metre deep holds are therefore exposed to silica and coal dust, plus diesel exhaust fumes – approximately the same environment as down a coal mine.