



## ► OCCUPATIONAL HEARING CONSERVATION

# Managing Occupational Hearing Conservation Data

By George R. Cook, MEd

Most of us over 50 just do not realize how much electronic data management and computer technology have permeated our society and affected our lives. We say we do, but in truth the change is so pervasive, we haven't the proverbial clue. And why should we? We are a generation that feel we could easily live without computers, followed by a generation that speaks affectionately about their lap tops and the Internet, testifying that they could not live without them.

Computers and hearing conservation software are absolutely necessary in managing an occupational hearing conservation program in both large and small plants. Companies simply could not keep up with the testing, notification, record keeping and professional review requirements without the efficiencies of the computer. Federal and state OSHA inspectors would have a difficult time finding out what they need to know if all records were kept manually. The OSHA Noise Standard, 1910.95, could not be adequately implemented by companies and could not be adequately enforced by regulatory agencies. It would be legislation for legislation sake, not the international model legisla-

tion for conserving workers' hearing that it has become.

The best demonstration of the need for computerization in hearing conservation is the comparison of individual test data to baseline or revised baseline audiometric thresholds. Most hearing conservation software will track each

ear separately. There are two important hearing threshold changes to track. The first hearing change is the Standard Threshold Shifts (or STS, as defined by the OSHA Noise Standard). The second is a 25 dB Average Change at 2000 Hz, 3000 Hz and 4000 Hz for entering on the OSHA 200 Log when exposures are 85 dBA TWA. Therefore, with two different baselines for each ear, there are a total of four baselines to be tracked. That may not be a problem in the first year or two, but with 20 or more years of tests, it would be extremely difficult to manually review any significant number of employees.

The technology onslaught has affected occupational hearing conservation just as it has every profession. It has given the field depth by creating a new jargon, tools for greater efficiency and innovative logic for solving problems. Today, many plants do hearing testing on new hires at the plant during the year. Annually, a mobile testing provider visits the plant to test the majority of employees. The testing unit secures computer files from the plant and loads that data onto the computer on the mobile unit. Following testing on the mobile unit, employees are given a Notification Report about hearing status and any change. Notifications are signed and training is provided at the time of the test. The database is left with the client on their computer network, and test results are electronically forwarded to the mobile unit computer center for additional screening and audiological review. Results of the reviews can be e-mailed to the plant computer to update files with revised baselines, medical referrals and instructions for follow-up.

In clinics or plants where the hearing testing is done by a plant *Occupational Hearing Conservationist* (OHC), the employee enters the hearing testing area and the OHC accessed the employee's demographic information from the computer network. The demographics and audiological history are updated. The employee is seated in the booth, instructions are given, earphones are applied and testing is performed by a micro-processor audiometer. The results are

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reviewed by the OHC and, if not acceptable, select frequencies are manually retested. When the test is acceptable, it is sent to the computer. There is some front-end editing of the hearing test data. For example, a hearing test with all zeros would be suspect and therefore the program would alert the user with a notice saying, "This test is all zeros. Are you sure you wish to save? Yes, No." A test with poor test/retest agreement at 1000 Hz would be judged invalid and the user would be flagged with a similar message.

Once the computer has accepted the data, it becomes part of the employee's database. A visual review can be made of the test results compared by the computer to previous tests. Tests are compared to the baseline test and when certain criteria are met, the computer software may actually be empowered to revise a baseline hearing test. The computer could make a mistake; therefore, all revised baselines need to be reviewed by an audiologist, otolaryngologist or other physician. This needs to be a feature of the software program. Some programs do not revise a baseline automatically but require the professional to indicate manually the comparison test within the employee's data file. When future tests are performed, they will be compared to the revised baseline.

A Notification Report is produced for the employee at the time of the test. The results can be displayed by graph or serially or both. There is a place for the employee to sign and date that they have been notified and, since this report is produced for every employee, it is common to find that there are also areas for employees to document that they have received additional required training such as hearing protection fitting and/or annual employee education.

Testing by computer, comparison of hearing test data at the time of the test with previous tests, and on-the-spot notification to the employee of test results is just the beginning. Scheduling reports, summary reports and audiologist and/or physician review can also be "high technology." Imagine compiling list upon list of employee information to schedule hearing tests by plant, department and job. This task is simple when done by computer. The company file server downloads demographic information that is imported into the hearing conservation software and a scheduling program prints a list of employees requiring a hearing test by department. In some software

packages, even an individual notification with a customized message can be printed.

Before the personal computer, information was kept on hard copy in file cabinets in duplicate files, one file in alphabetical order to locate employees by name, and a second file by test date to schedule testing. To find out how many employees were tested and how many STSs have occurred in a year, it literally took a nurse or other personnel days to search through the files manually, a time consuming process. Not so anymore. In seconds, management can

look for a combination software package for your clinic and hearing conservation programs. To the author's knowledge, there are no major developers that have put the two activities together. This is not true for occupational clinics. There are programs specifically written for occupational clinics providing hearing testing and there are other programs available that are adaptable to occupational health clinic use.

In the opinion of the author the following are 10 things to look for in a PC package of occupational hearing conservation software:

- 1 Ability to set up multiple directories.** If you are a service provider, you will have different companies to service. The software may have entry for multiple companies but you must be sure each company can be in a different directory. If all companies are in the same directory, an employee leaving a company and going to another of your client's plants will be pulled up when his/her baseline test for the new employer is to be performed. The past test will be a part of the new employer's files. This makes for a concerned client when the employee is notified of an STS or has an OSHA 200 recordable and has just begun employment.

- 2 Communication capabilities for peripheral equipment.** Check to be sure the software will communicate with your audiometer and other testing equipment such as a spirometer, vision tester or blood pressure measuring equipment (sphygmomanometer). It would be irritating to purchase software and then to have to purchase new testing equipment. All testing equipment is not able to communicate or sometimes is not worth the time and expense to retro fit for communications.

- 3 Audiometer vs. software.** Some software is very powerful and contains most of the fields needed. The printer is also driven by the computer. Therefore, an expensive audiometer with data entry pad and printer may be an unnecessary expense. All that may be required is a microprocessor audiometer that is capable of securing a valid test and communicating with a computer. These are available for around \$2000 or less.

- 4 Help desk.** Does the developer have a decent help desk? The help desk is telephone access to a person versed in computer technology and the software product you are using. The help desk is there to assist with problems that users have with the product. From the viewpoint of the

The top screenshot shows the 'Audio All Test Screen' with fields for Company (J.S. HEALINGWORLD), First Name (JAMES HILL), Last Name (JAMES HILL), Date of Birth (01/01/51), Sex (M), Date of Hire (01/01/51), and Employee No. (241113141). It also displays 'Right Ear Baseline' and 'Left Ear Baseline' as 00/7/51. Below this is a table for 'Audiogram Tests' with columns for Date, Time, Type, and various frequency ranges (250, 500, 1000, 2000, 4000, 8000 Hz) for both Right and Left ears. The bottom screenshot shows the 'Audio Test Entry Screen' with fields for Employee (JAMES HILL), Testing Schedule (in months), Test Date (1/1), and Type. It includes checkboxes for 'Comp' (USH), 'Plant' (OSD), 'Dept' (COM), and 'Job' (FOREMAN). There are also fields for 'Oscilloscope (Right)', 'Oscilloscope (Left)', 'Ear Protection Used', 'Recent Noise Exposure (14 HRS)', and 'Physician Visit/Hearing'. At the bottom, there is a field for 'Audiometer Code'.

Samples of the Audio All Test Screen (top) and the Audio Test Entry Screen.

view statistical summary reports that will count and list by name all significant changes in hearing. STS reports and possible OSHA 200 Log entries are available and are state specific. Graphs comparing plants or departments and statistical trending are standard features in most software. Even the professional review process has electronic data management (EDM). Program files can be e-mailed across the Internet making a distant reviewer appear as if they were in the next office.

If you are an independent hearing conservation service provider, or a provider doing some hearing conservation and a lot of something else, where do you stand in this technology maze? First of all, if you are a hearing care professional in private practice, don't



manufacturer of the software, customer expectation for help desk services may be unreasonably high. They end up providing computer basics, trouble-shooting equipment, network administration, etc. No wonder we hear about the help desk position fast becoming America's most stressful occupation. However, the consumer should reasonably expect to talk to someone about a user problem and expect intelligent answers and timely follow-up. A manufacturer may have all the lights and whistles in a software package but lose the advantage by having an inadequate help desk.

**5** *Developers.* Who wrote the software? Was it an audiometer manufacturer promoting audiometers? Was it a consulting group providing support services? Was it a software developer providing a lead-in package? We often go to the trouble to inspect every aspect of software features but do not take the time to find out the orientation of those who wrote it.

**6** *Software features.* There are many desirable software features, but here are a few special ones to look for:

► *OSHA record keeping documentation.* For example, the Notifica-

tion Report should have a place for documentation of multiple requirements as STS notification, hearing protection fit and training, and annual educational training.

► *Single entry screens.* When performing or reviewing hearing tests, is the test information on a single screen or as few screens as possible? This keeps the user from getting lost in the software.

► *NHCA Criteria for review.* A National Hearing Conservation Assn. (NHCA) committee of professionals has developed and recommended a set of criteria for baseline revision. How close does the review criteria in the software come to the NHCA criteria? A copy of the NHCA criteria is available upon request by contacting: *NHCA, 9101 E. Kenyon Avenue, Suite 3000, Denver CO., 80237; 303-224-9022; e-mail: nhca@gwami.com; website: http://www.hearingconservation.org*

**7** *Other services.* Are you going to do other types of testing? If so, you do not want a software package for each service. If the hearing software is a module of a larger package, you may wish to utilize the common database for the demographic information.

**8** *Other users.* Examine the software in action before you buy. Sit down at the computer and ask to be walked through the operations. You should be able to catch on quickly.

**9** *Price.* Just because it is expensive, does not mean it is the best. I have been told several times, "We bought this expensive system because we wanted the best." The expensive system was inadequate for the job and had to be replaced with a less expensive one that met the specific needs of the client. Sometimes trafficking people and ease of operation is more important than that glitter.

**10** *Language.* With the increase of Spanish speaking workers in America, and with the increase in manufacturing in Spanish speaking countries, it is important to investigate the language features of the software. It is desirable to have the Employee Notification Report and Audiological History available in Spanish at a minimum. ♦

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