

NAVY NOISE REDUCTION PATENT USED BY MILITARY AND PRIVATE INDUSTRY

When a well-known automobile manufacturer was looking for a way to decrease noise in its automotive hoses, it turned to a technology patented by the U.S. Navy. The technology is a unique sound-absorbing material, referred to by the Navy as *NAMRL material*, which was developed at the Naval Aerospace Medical Research Laboratory (NAMRL) in Pensacola, FL. The Chief of Naval Operations' Environmental Protection, Safety and Occupational Health Division originally sponsored noise attenuation research to protect Navy helicopter pilots from hearing loss. That research led to development of the NAMRL material by psychoacoustics research scientists, Dr. Gerry Thomas and Dr. Bill Cushman, and by Bob Hain, CAPT, MC, USN, Navy Medical Corps physician and Director of NAMRL's Science and Technology Directorate.



"Think of a double-paned window," said CAPT Hain. "NAMRL material is excellent at attenuating, or dampening, noise because sounds dissipate when they pass from one medium, such as air, to another, such as circumaural earmuffs. That's the theory behind sound absorption and how the NAMRL material works."



CAPT Hain explained that particles of differing sound-dampening ability – what researchers call *differing acoustic*

impedance - are mixed into a host material such as silicon rubber or plastic. Tests conducted by the Departments of the Navy and Army show that circumaural earmuffs made from the patented NAMRL material are 50-100% more effective in protecting the user from environmental noise exposure than commercially available hearing protection products.



According to Dr. Hain, a major advantage of the NAMRL material is that it is lightweight and extremely versatile. The research team is currently working on developing applications for large surface areas, e.g., sheets of NAMRL material for use on ship bulkheads, and another version of the NAMRL material that will be sprayed onto surfaces and ceilings to reduce noise. The Navy is also working on a joint project with the

Engineering Departments of Florida A&M and Florida State Universities to apply the NAMRL material technology to advanced structural composites, such as graphite-loaded polymers for use in aircraft. Eventually, NAMRL material will be mixed into plastics, rubber, and cement. The research is expected to be completed in 2002.

Circumaural earmuffs made with the NAMRL material are currently being manufactured for use by Navy personnel who work in noise hazardous environments. The additional



protection provided by the new earmuffs will enable workers to remain in noise hazardous environments for up to three hours longer than is now allowed with currently available hearing protection.

Two commercial enterprises are approved by the Navy to use the NAMRL material in industrial applications once the patented technology is successfully being applied to large sheets. These

companies anticipate sales in the \$50-\$75 million per year range. The Navy will receive royalties on these sales.

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