

Handing over of WARSHIP TECHNOLOGY products at NSTL, Visakhapatnam

SELF RELIANCE IN WARSHIP TECHNOLOGY

Dr. V. Bhujanga Rao, Director, Naval Science and Technological Laboratory, Visakhapatnam pleased to inform that warship technology products developed by the laboratory will be handed over to Indian Navy at a function being held at Manasi auditorium, NSTL on 31st October 2007. Padmasri Dr A Sivathanu Pillai, Distinguished Scientist and Chief controller (R&D), DRDO Headquarters will hand over the products to Vice Admiral DSP Varma, PVSM,AVSM,VSM, Chief of Materials, Naval Headquarters.

NSTL is involved in development of warship technologies useful for evading detection by enemy ships/submarines. These technologies are aimed for use in modern warships under design and construction. NSTL has nurtured these technologies in the recent past and is progressing strongly towards self reliance in this critical arena. Warship technology is a multidisciplinary field covering different aspects such as acoustics and electro-magnetics covering a wide band of frequencies. Hence an inter disciplinary and holistic approach has been adopted in developing these products.

For defence preparedness of our ships, a number of products were developed by NSTL to avert damages due to enemy attacks. Some of the products developed are acoustic enclosures, acoustic silencers, double stage vibration isolation systems, Radar transparent ladder, stanchions, camouflage screens, helo net frames and composite blowers among many others. All these products were subjected to extensive laboratory and shipboard evaluations. After successful evaluations, these products were accepted for induction into Indian Navy.

Brief technical details of these products is given in the enclosed brochure.



Self-Reliance in Warship Technology for the Indian Navy for enhanced survivability, detection – avoidance and 'first strike capability' of Naval Platforms



ACOUSTIC ENCLOSURE / HOOD

Acoustic enclosures for ship machinery are designed for noise reduction. Design of acoustic enclosures for shipboard machinery is a difficult task because of various constraints such as space, routing of pipes and harsh marine environment.

FEATURES:

- Panels with Steel and rock wool materials
- Achievable Insertion loss of up to 30 dB (A)
- Modular construction for ease of assembly
- Air circulators for heat dissipation
- Access for maintainability
- Importance to non-acoustic aspects such as ventilation, safety and Lighting

NSTL developed a shipboard acoustic enclosure for a 500 kW diesel alternator for application on board IN Ship. NSTL also developed acoustic hood for reduction gear lube oil pump of the ship.



ACOUSTIC SILENCER

Acoustic silencer is useful for noise control of intakes/exhausts of air/gas handling systems. These silencers need compactness while meeting performance requirements.

FEATURES:

- Parallel baffle type
- Baffles filled with sound absorbing materials
- Noise reduction in broadband frequencies
- Insertion loss up to 15 dB(A)
- Designed to stringent space and weight constraints
- Minimum pressure drop

A Parallel baffle type dissipative silencer for ventilation fan and gas turbine have been developed and installed by NSTL onboard frigate class ship. The silencers are working satisfactorily providing 15 dB (A) insertion loss.



TWO-STAGE MOUNTING SYSTEM

A two-stage mounting system (raft mounting) is employed where there is a demand for high structure-borne noise attenuation. The main objective of a two-stage mounting system is to reduce vibration levels from machinery to foundation, and thereby to reduce radiate noise levels from ship hull.

The critical design aspects of the system are:

- Optimum mass of raft (intermediate mass).
- Design of suitable mounts for both stages for desired vibration reduction.
- Minimum height of the system for ensuring stability.

FEATURES:

- Double stage isolation for improved vibration isolation
- Vibration levels reduction up to 25-40 AdB// $1e^{-5}$ m/s² over broad frequency range
- Appreciable reduction in under water noise
- Provision of limiters for lateral stability

NSTL has developed and installed a two-stage mounting system for shipboard HP air compressor. A significant vibration reduction (25 dB) has been achieved, which in turn leads to reduced radiated noise levels.





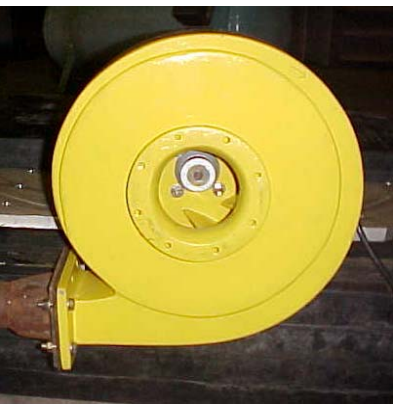
IR SUPPRESSION SYSTEM FOR NAVAL PLATFORMS

Naval Platforms IR Signature levels depend on uptake metal surface temperature and exhaust plume temperature. To minimize the IR signature levels NSTL has designed and conducted full scale tests with multi ring eductor Diffuser type IRSS devices for both Diesel and Gas turbines.

DE-IRSS devices designed for new construction frigates are proved for full scale operational conditions conducted at KOEL, Nasik. The device has achieved 90% signature reduction in IR bands. The item productionised & inducted into service for installation on new construction Frigates and Corvettes.

FEATURES:

- Cooling of exhaust gases, funnel etc for reduced IR signature
- Minimum back pressure, Ease of maintenance
- Design customized for different configurations of gas turbine and diesel engine exhaust systems



LOW-NOISE COMPOSITE BLOWER

On naval platform blowers of ventilating systems are one of the major noise sources. To reduce noise signature NSTL has designed a composite blower and tested for all environmental tests. Appreciable noise reduction achieved.

FEATURES:

- Blades & Casing made with composite
- Low Vibration and noise
- Shock withstandability
- Eliminates corrosion



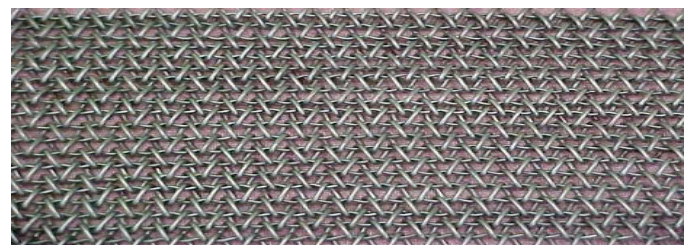
COMPOSITES

Composites offer many advantages over other materials used in warships. Due to its high strength / weight ratio and low Radar Cross Section use of composite are recommended for new construction ship board applications.

NSTL has designed and developed a number of composite products such as composite stanchions, Radar transparent ladders, RCS Screen, Helo safety net frames and pipes for ship board application. Toughening agents developed by NMRL have been used. These products were subjected to all tests for marine withstandability.

FEATURES:

- High strength/ weight Ratio
- Maintenance - free
- Non-corrosive
- Low RCS signature
- Can be tailored for desired characteristics



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