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DATA ITEM DESCRIPTION

Title: AIRBORNE NOISE ANALYSIS AND CONTROL DESIGN HISTORY BOOKLET

Number: DI-HFAC-81278A
AMSC Number: N9538
DTIC Applicable: No
Preparing Activity: SH
Applicable Forms:

Approval Date: 20150413
Limitation: N/A
GIDEP Applicable: No
Project Number: HFAC-2015-012

Use/relationship: The Airborne Noise Analysis and Control Design History Booklet documents the Contractor's noise analysis, noise control design, and quality assurance inspection efforts to demonstrate compliance with requirements of MIL-STD-1474.

a. This Data Item Description (DID) contains the format, content, and preparation instructions for the data generated in response to the applicable tasks in MIL-STD-1474 and ANSI/ASA S12.67, *Pre-Installation Airborne Sound Measurements and Acceptance Criteria of Shipboard Equipment*.

b. This DID shall be applied for each noise grade, class, rating, and type of equipment to be tested for airborne noise performance when MIL-STD-1474 and ANSI/ASA S12.67 is invoked in the contract specification or statement of work.

c. This DID supersedes DI-HFAC-81278.

Requirements:

1. Reference documents. The applicable issue of the documents cited herein, including their approval dates and dates of any applicable amendments, notices, and revisions shall be as specified in the contract.

2. Format. The Airborne Noise Analysis and Control Design History Booklet shall be in the Contractor's format.

3. Content. The Airborne Noise Analysis and Control Design History Booklet shall contain the following:

a. Identification of Contractor personnel responsible for noise performance including key personnel with managerial oversight.
b. A description of their responsibilities, authority to alter the ship design, and authority to implement noise control measures.

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3.1. Noise limits for compartment, on-deck stations, and the ship operating condition(s) during which the noise limits apply including underway at speed and when dockside. Special considerations such as ship noise at a distance shall be identified, if applicable.

3.2. The title, Naval Sea Systems Command (NAVSEA) identifying number, and revision number of ship drawings, i.e., general arrangement for the following used to develop predicted noise levels:

a. machinery arrangement;
b. insulation arrangement and details;
c. joiner arrangement and details;
d. heating, ventilation, and air conditioning (HVAC) arrangement and details;
e. piping system arrangements and details; and
f. diesel exhaust system arrangements and details.

3.3. The Booklet shall contain a description of the analysis procedures used to predict compartment and on-deck station dB(A) and octave band noise levels.

3.4. Octave band noise predictions and the A-weighted overall noise predictions, for each compartment and on-deck station assigned a noise criterion (limit); and predicted time weighted average (TWA) noise levels, as applicable shall be included.

3.5. The Booklet shall include a listing of the octave band noise source levels assigned to machinery items, equipment items, and fans including airborne noise source levels and structureborne noise source levels; and an explanation of how the noise source levels were derived.

3.6. A listing of the octave band sound transmission, radiation efficiency, and attenuating properties of ship constructions encountered in the predictions including, as applicable,

a. bare bulkheads;
b. bulkheads with noise control treatments, thermal treatments, and sheathing applied;
c. bulkheads when covered with joiner linings;
d. decks when covered with floating floors, suspended ceilings, or insulations;
e. mounting system transmission losses;
f. lined and unlined ducts; and
g. acoustic enclosures, barriers, and plena.

3.7. The Booklet shall include a listing of the following:

a. machinery,
b. propulsors,
c. equipment,

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d. contractor furnished equipment (CFE),
e. government furnished equipment (GFE),
f. piping system,
g. HVAC system noise contributions, and
h. the combined overall resultant predicted noise levels for each compartment and on-deck station that is assigned a noise criterion (limit).

3.8. Where noise level measurement locations are known, the Booklet shall include the predictions for reverberant and direct field noise contributions. If more than one noise measurement condition (ship operating state) is specified, the Booklet shall also include predicted noise levels for each condition.

3.9. A listing of assumptions used in developing the noise predictions and a justification for each assumption shall be included.

3.10. Noise levels and noise excesses, predicted on a compartment-by-compartment basis, applicable to the ship design and ship operating state prior to the inclusion of additional noise control measures beyond those explicitly identified in the ship specification shall be included.

3.11. A description of the analysis procedures for computing personnel TWA exposures if noise excess or hazardous conditions are predicted or reported.

3.12. The Booklet shall include design recommendations and options for additional noise control measures beyond those explicitly identified in the ship specification which, if implemented, are predicted to eliminate noise excesses and shall also include:

a. A table listing which machinery and equipment items including piping systems will be installed on resilient mounts (single or compound), mounting system type (low natural frequency or distributive isolation material), mount make and model number, and the number of mounts that will be installed per machinery item or equipment item.

b. References to drawings identifying specific make, model, and type in reference to the following:
   (1) insulations recommended for noise control and areas of coverage,
   (2) damping materials recommended for noise control and areas of coverage,
   (3) floating floors recommended for noise control and areas of coverage,
   (4) machinery items and pipe systems to be mounted resiliently,
   (5) HVAC drawings showing sections of duct fitted with linings or laggings that are recommended for noise control showing areas of coverage, and
   (6) any special noise control measures such as relocation of compartments, inclusion of barriers, acoustic enclosures, mufflers, cords, flexible hose or bellows assemblies, pulsation dampers, high impedance foundations, compound mounting systems, and high sound transmission loss doors and windows.

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3.13. The Booklet shall include a list of references that identify reports containing analysis and design information for noise control measures.

3.14. The Booklet shall cite any diesel exhaust system mounting analyses and design studies to ensure proper loading, resonance avoidance, and evaluation of thermal exposure in cases where elastomeric mounts are used.

3.15. A list of compartments and on-deck stations experiencing measured noise excesses resulting from ship trials, recommendations for newly identified additional noise control measures to eliminate measured excesses, and revised noise (octave band and overall A-weighted) predictions assuming the inclusion of the newly identified additional noise control measures and materials into the ship design. Impacts on design and cost shall be included.

End of DI-HFAC-81278A