

CETENA

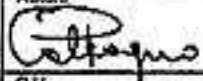

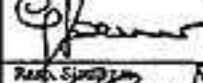
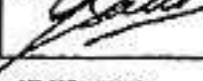
Rapporto Tecnico

Technical Report

N° Rapporto: 5915

Abstract

This report concerns with the results of the adhesiveness test of insulation sprayed materials, performed with a shaker vibrations, conducted by CETENA team on a Mock-up fitted out in ATSM (TRIESTE).

Titolo Adhesiveness Test of Insulation Sprayed Materials		Autore 	
Rapporto N° 5915		C.U. 	
Autore/s Borghino D. Calcagno P. Loi G.		Autografo 	
Data April 1996		Data 	
Circolazione Interna <input type="checkbox"/> Internal Only Libera <input type="checkbox"/> Free Confinata <input checked="" type="checkbox"/> Commercial in confidence Classificata <input type="checkbox"/> Classified		CIRCULATION	
Figure N° Sheet N°		NOTE	
CODICI DISTRIBUZIONE FINCANTIERI - MC/ASR		DISTRIBUTION CODES	

1. INTRODUCTION

On request of FNCANTIERI MC/ASR vibration measurements have been carried out by CETENA on a Mock-up fitted out in Arsonale Triestino San Marco, to test the adhesiveness of ASFI insulation sprayed materials:

- Dendamis fire protection
- Sound - prof noise insulation
- Thermal - prof thermal insulation

2. TEST METHOD

A shaker has been installed on the top of the mock-up (see fig.1) and near its head an accelerometer has been positioned to control the vibration levels induced on the structure by the shaker.

The results are shown in the diagrams (frequencies vs.vibration velocity amplitudes).

The mock up dimensions were: L. 6 mt, W. 3 mt, H. 3 mt, with steel 5 mm thickness, with main stiffeners 450 x 150 x 8 x 10 and secondary stiffeners 100 x 8 mm.

The mock-up was prepared in this manner:

INSIDE

CEILING: SOUND-PRUF (Acoustical under lining)

18 mm 190 $\frac{Kg}{m^3}$ + 18mm 55 $\frac{Kg}{m^3}$

raw finishing

BULKHEAD: DENDAMIX (A60 under lining)

40 mm 190 $\frac{Kg}{m^3}$

raw finishing

BULKHEAD: THERMAL-PRUF (Thermal under lining)

25 mm 55 $\frac{Kg}{m^3}$

raw finishing

BULKHEAD: DENDAMIX (A60 on vieww)

40 mm 190 $\frac{\text{Kg}}{\text{m}^3}$

smooth finishing

OUTSIDE

TOP

The shaker was positioned here in the middle

BULKHEAD: THERMAL-PRUF (Thermal on view)

30 mm 55 $\frac{\text{Kg}}{\text{m}^3}$

smooth finishing

BULKHEAD: SOUND-PRUF (Heavy acoustical on view)

25 mm 190 $\frac{\text{Kg}}{\text{m}^3}$ + 15 mm 190 $\frac{\text{Kg}}{\text{m}^3}$

medium finishing

BULKHEAD: DENDAMIX (A60 on vieww)

40 mm 190 $\frac{\text{Kg}}{\text{m}^3}$

smooth finishing

Below the ceiling stiffeners, two pipes (\varnothing 50 mm and \varnothing 100 mm) and air conditioning ducts (400 x 200 mm) were insulated.

This insulations have about 20 mm thickness

The mock-up was excited at the following 5 frequencies:

5 Hz, 10 Hz, 15Hz, 25 Hz and 50 Hz and the test parameters are shown in the following table:
(see.table)

3. CONCLUSION

After each test the integrity of the material was inspected

No part of the material came off or unglued from the mock-up.

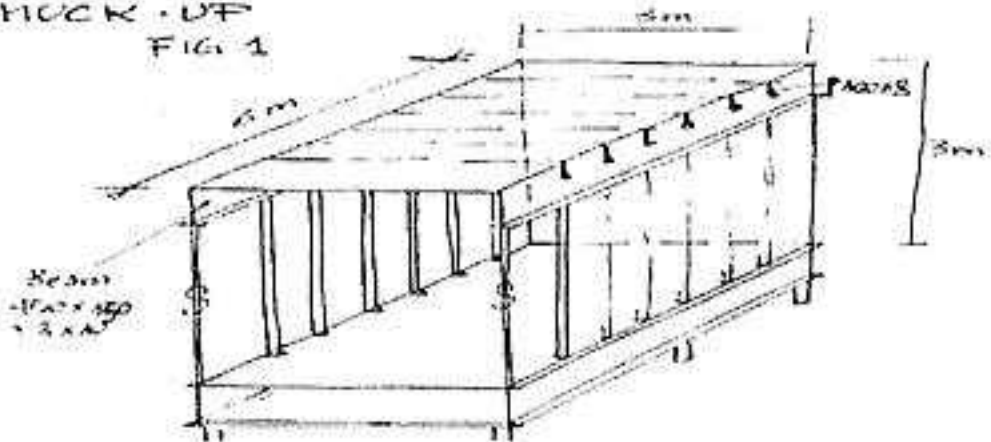
TABLE - Test parameters

Test Nr.	Excitation Frequency Hz	Velocity Amplitude mm/s	Endurance test hour	Notes
1	5	3*	1	Vertical direction on the mock up, near the shaker
2	10	9	1	
3	10	19	1	
4	15	9	1	
5	25	9	1	
6	50	9	1	
7	15	100	1	Horizontal direction on the lateral bulkhead
8	15	135	6	

NB : * max. value allowed by the shaker at full power.

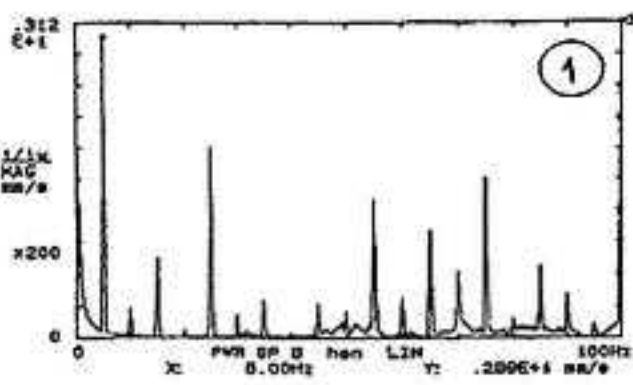
The velocity amplitude of 9 mm/s (0 - peak value) was tested according to the upper limit of the 6954 - ISO : Mechanical vibration and shock - Guideline for the overall evaluation of vibration in merchant ships.

MUOK - UP
FIG. 1



POS. 1V 89Hz
200Hz AC AC/ 50V B: AC/ 2V 3.5UM 0/10 DUAL 1K

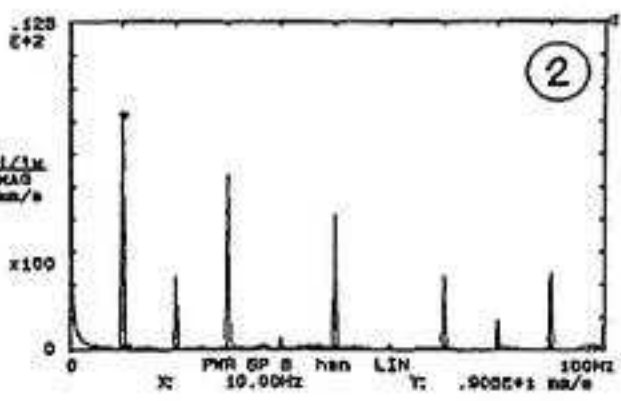
PHR SPECTRUM	CHS	ms/s
1	5.00Hz	.289E+1
2	25.00	.196E+1
3	75.00	.158E+1
4	90.00	.138E+1
5	90.00	.104E+1
6	13.00	.788E+0
7	90.00	.709E+0
8	70.00	.659E+0
9	90.00	.487E+0
10	90.00	.402E+0



POS. 2V 10 Hz

POS. 2V 10 Hz

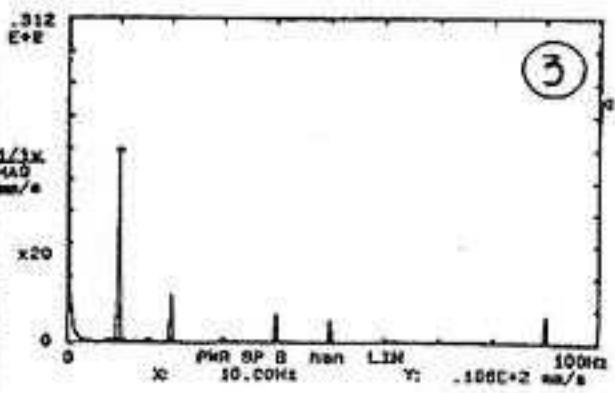
PHR SPECTRUM	CHS	ms/s
1	10.00Hz	.005E+1
2	30.00	.670E+1
3	50.00	.818E+1
4	90.00	.300E+1
5	70.00	.292E+1
6	20.00	.280E+1
7	90.00	.118E+1
8	1.50	.692E+0
9	40.00	.480E+0
10	2.75	.346E+0



POS. 2T 10 Hz

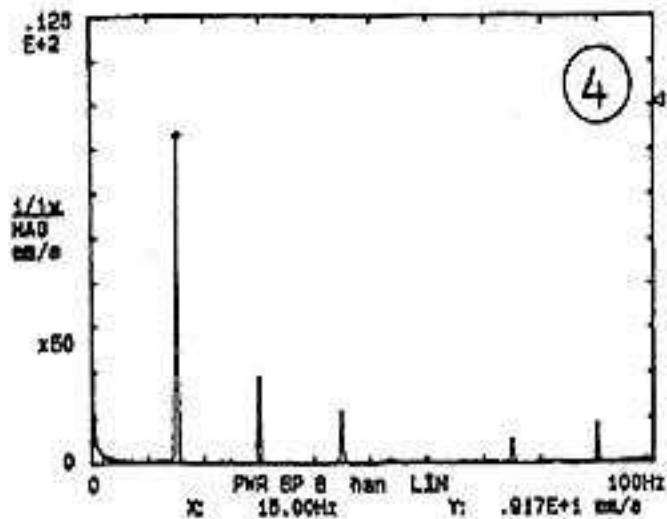
POS. 2T 10 Hz

PHR SPECTRUM	CHS	ms/s
1	10.00Hz	.150E+2
2	20.00	.490E+1
3	40.00	.289E+1
4	90.00	.248E+1
5	90.00	.210E+1
6	90.00	.411E+0
7	6.00	.310E+0
8	16.00	.284E+0
9	80.00	.215E+0
10	38.75	.100E+0



P08. 3V 18 Hz

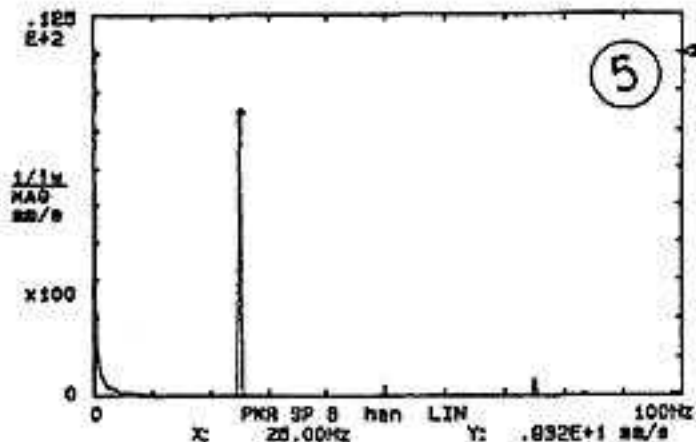
P09. 3V 18 Hz



PWR SPECTRUM	ChB	
1	16.00Hz	.817E+1 mm/s
2	30.00	.298E+1
3	45.00	.147E+1
4	60.00	.110E+1
5	75.00	.686E+0
6	2.50	.220E+0
7	60.00	.157E+0
8	67.00	.125E+0
9	98.78	.140E+0
10	7.00	.806E-1

P09. 4V 25 Hz

P08. 4V 25 Hz

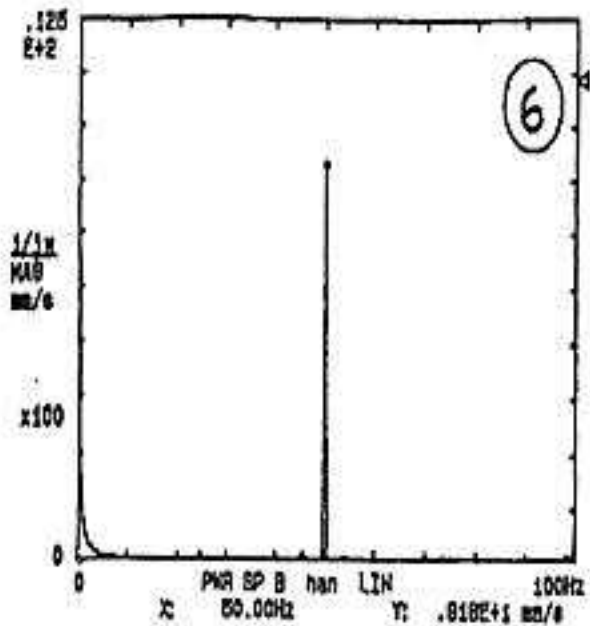


PWR SPECTRUM	ChB	
1	25.00Hz	.832E+1 mm/s
2	75.00	.388E+0
3	60.00	.359E+0
4	2.78	.327E+0
5	3.78	.251E+0
6	5.78	.123E+0
7	7.78	.944E-1
8	63.50	.836E-1
9	98.50	.107E+0
10	10.28	.546E-1

P09. 5V 50Hz

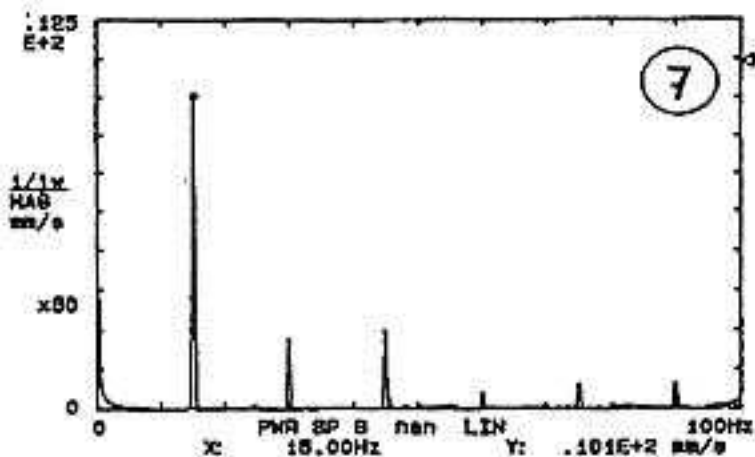
P08. 5V 50Hz

PWR SPECTRUM ChB



1	39.4914	.818E+1 mm/s
2	45.75	.208E+0
3	4.28	.172E+0
4	24.75	.157E+0
5	89.50	.174E+0
6	8.50	.121E+0
7	73.75	.101E+0
8	54.00	.808E-1
9	54.50	.718E-1
10	70.50	.788E-1

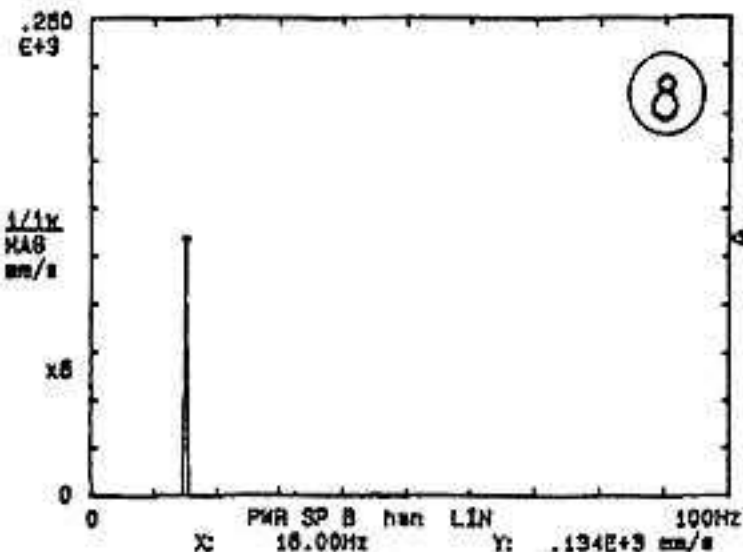
P08. 5V 10Hz



P09. 5V 10Hz

PWR SPECTRUM	ChB	
1	15.00Hz	.101
2	45.00	.051
3	30.00	.027
4	90.00	.064
5	75.00	.040
6	60.00	.020
7	95.00	.027
8	95.00	.206
9	24.50	.174
10	60.50	.121

P08. 3T 15 Hz



P09. 3T 15 Hz

PWR SPECTRUM	ChB	
1	15.00Hz	.134E-
2	30.00	.023E-
3	45.00	.105E-