

# ANALYSIS OF GENSET ANTI VIBRATION MOUNTS AFTER 17 YEARS OF USE

**AMC**  
MECANOCAUCHO  
NOISE AND  
VIBRATION  
SOLUTIONS



*AMC-MECANOCAUCHO BRB 150 70Sh mounts.*

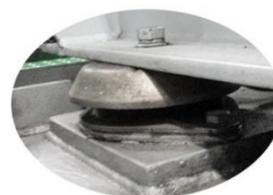
**AMC MECANOCAUCHO has characterised 6 mounts after 17 years of use to check their mechanical properties, a comparison has been made to a newly manufactured mount of the same type.**

## INTRODUCTION

Durability is a crucial factor which should be considered when selecting anti vibration mounts. At AMC-MECANOCAUCHO, this factor is taken into account when designing each and every one of our products.

As an example of this, AMC MECANOCAUCHO has analysed the replacement of a set of anti-vibration mounts (BRB 150 70Sh, Ref. 135164) used on the power generation system (Volvo TAMD16 Engine + Stamford Alternator) of the MPV Jura (boat No. 720). The MPV (Marine Protection Vessel) Jura is one of the fleet of vessels operated by Marine Scotland, the Scottish Government directorate responsible for the integrated management of Scotland's seas".

These mounts were installed in 2004 and a comparison of the mechanical properties of these removed parts after 17 years has been made against a newly manufactured item.



Several tests have been made to collect the most information possible.

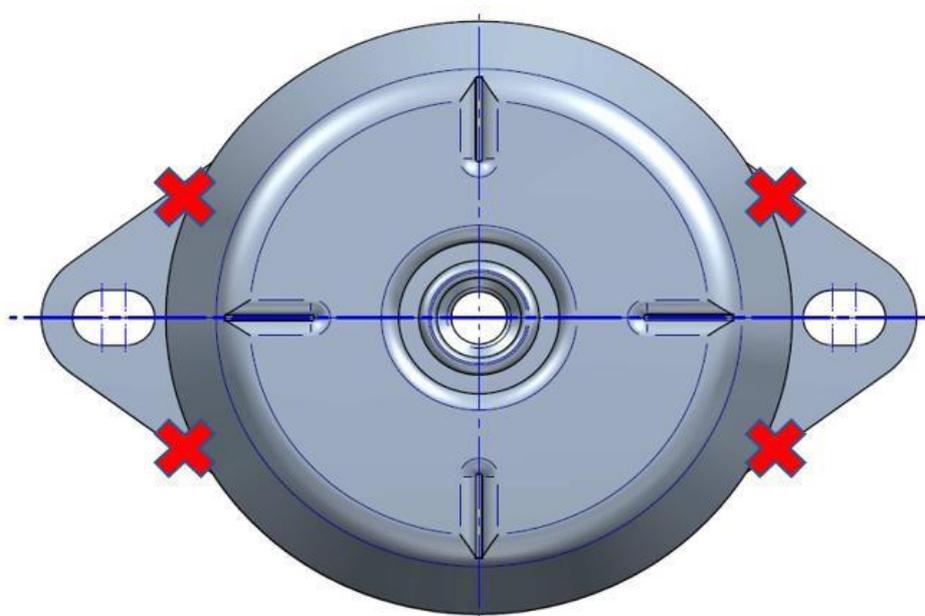
## VISUAL AND DIMENSIONAL TESTS

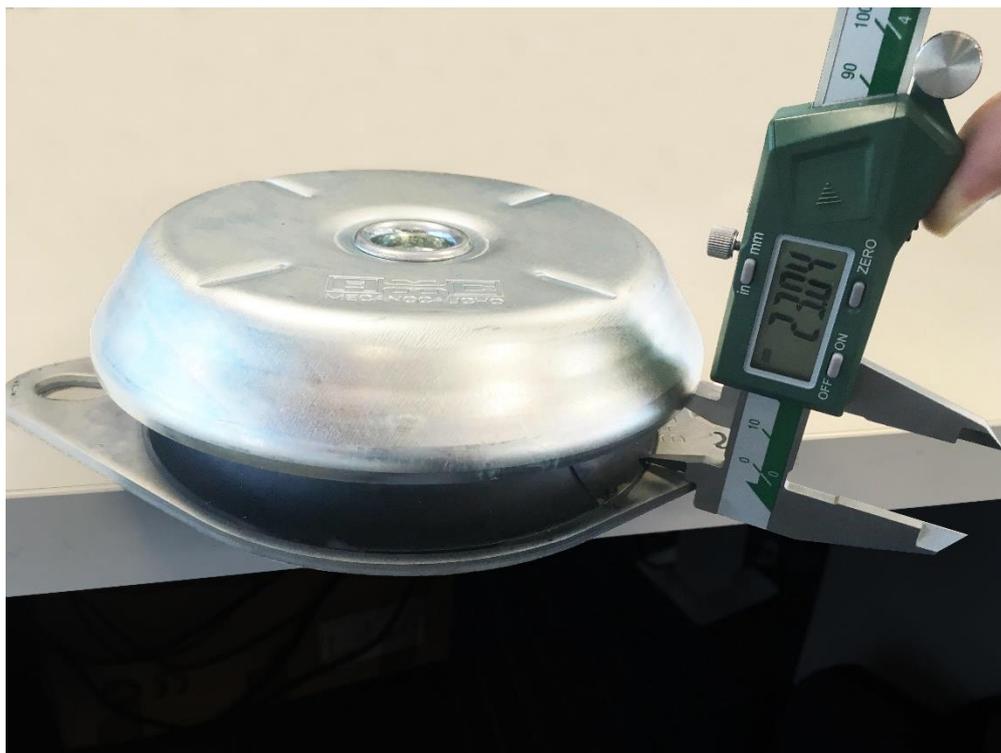
As a first step, the technical department of AMC-MECANOCAUCHO carried out a visual analysis of the mounts to verify that they did not have any damage from the last 17 years of use. In particular checks were made for cracks, signs of corrosion and any excessive deformation of any of its components.



After the visual analysis, none of the mounts showed any defects which would be of concern.

In addition to this a dimensional analysis of the samples was carried out, comparing the height of both cases (new and used mounts) to check the level of permanent deformation (set) of the pieces. To do this the distance between the base and the underside of the bell was measured at the 4 points indicated in the following picture:





The obtained results are shown in the following table:

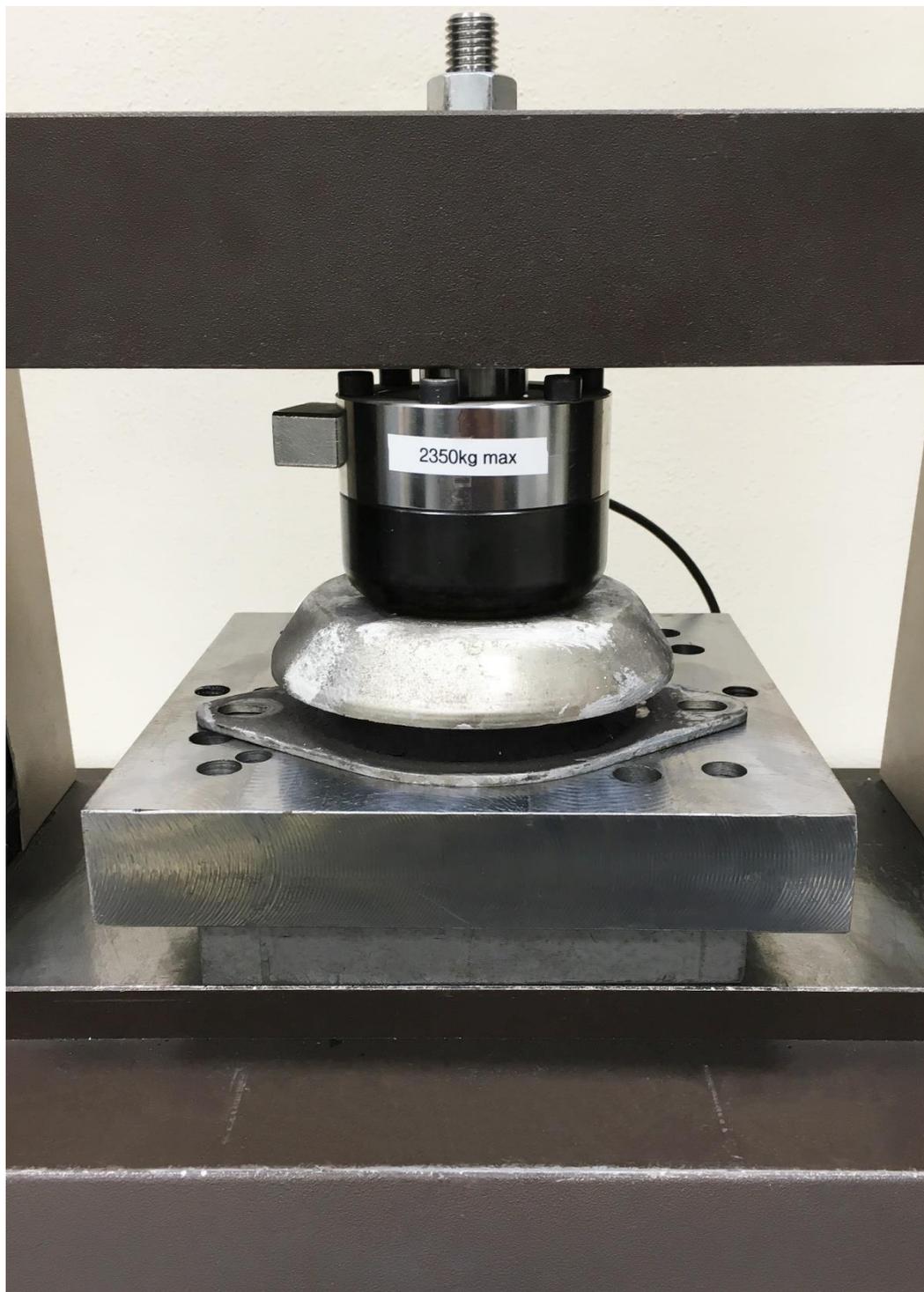
| Mount        | Average height (mm) | Difference from new mount* (mm) |
|--------------|---------------------|---------------------------------|
| Original - 1 | 19,22               | -3,85                           |
| Original - 2 | 19,00               | -4,07                           |
| Original - 3 | 18,64               | -4,43                           |
| Original - 4 | 19,30               | -3,77                           |
| Original - 5 | 16,57               | -6,50                           |
| Original - 6 | 18,67               | -4,40                           |
| New - 1      | 23,03               | -                               |
| New - 2      | 23,11               | -                               |

\*Average between New -1 and New -2 has been considered as the original height.

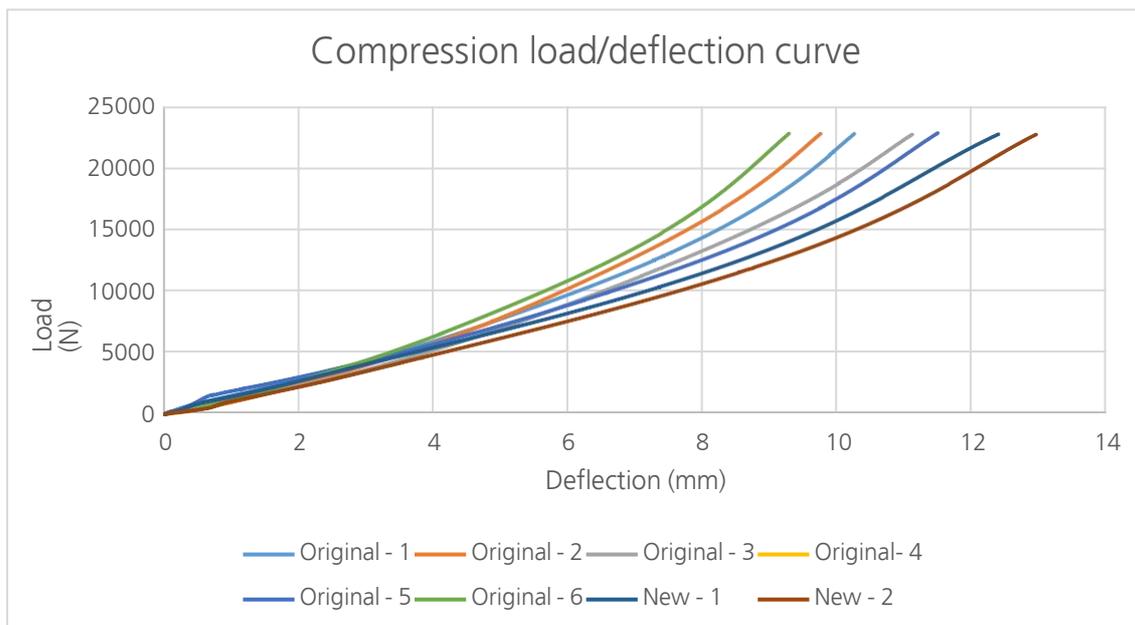
As shown in the table above, the average permanent deformation across all 6 mounts would be 4.5mm.

## AXIAL STATIC TEST

A compression test has been carried out on each of the original mounts up to a load of 2350kg in order to check their load and deflection characteristics.



For the purpose of comparing each mount, the value of the deformation when the mount is under a load equivalent to 60% of its maximum load has been used (600kg, as the maximum load of the BRB 150 70Sh is 1000kg).



These results were compared with the reference values which are defined in the AMC- MECANOCAUCHO catalogue for the studied part. Taking into account the tolerances defined in the ISO 3302 standard (tolerances for rubber moulded parts), which allow a deviation of  $\pm 20\%$  from this value.

| Mount        | Deflection at 60% of maximum load (mm) | % Difference with catalogue (4,35mm) |
|--------------|--|--------------------------------------|
| Original - 1 | 4,05                                   | -8 %                                 |
| Original - 2 | 4,13                                   | -6,1 %                               |
| Original - 3 | 4,47                                   | 1,6 %                                |
| Original - 4 | 3,93                                   | -10,7 %                              |
| Original - 5 | 4,21                                   | -4,3 %                               |
| Original - 6 | 3,86                                   | -12,3 %                              |
| New - 1      | 4,43                                   | 0,7 %                                |
| New - 2      | 4,87                                   | 10,7 %                               |

As shown in the previous table, the results indicate that even after 17 years of operation the mounts would still be within the margins allowed by the ISO 3302 standard. This shows that they would still be able to continue working correctly.

## SIMULATION BY A SINGLE DEGREE OF FREEDOM CALCULATION

Finally, a simulation has been carried out to show the predicted change in vibration isolation that the mounts would provide to see how this has altered over time. A single degree of freedom calculation has been carried out to check the performance that the received mounts would be able to offer (the worst possible case has been analysed).

The isolation level of the mounts has been calculated against a sinusoidal excitation of 1500rpm at the load point of 70% of its maximum load (700kg).

| Description    | Weight [Kg] | Excitation Frequency [rpm] | Number of Mounts | Article              | Deflection [mm] | Natural Frequency [Hz] | Vibration Isolation [%] |
|----------------|-------------|----------------------------|------------------|----------------------|-----------------|------------------------|-------------------------|
| New mount      | 700         | 1500                       | 1                | Type BRB 150 D70 M16 | 5               | 9,99                   | <b>80,4</b>             |
| Original Mount | 700         | 1500                       | 1                | Type BRB 150 D70 M16 | 3,2             | 12,45                  | <b>66,4</b>             |

As shown in the table above, the isolation level reduction of the received mount with less favourable properties (66,4%) in comparison with a mount with the mechanical properties of the catalogue (80.4%) would be less than 15%.

## CONCLUSIONS

It can be concluded that the analyzed mounts would still be able to continue working and provide a good level of isolation, even after 17 years of use.

AMC MECANOCAUCHO manufactures anti-vibration mounts and has a team of application engineers to help you with your installation needs, so do not hesitate to contact our technical department if you need help on this matter.