

## In the name of GOD

# **Dynamic vibration absorbers**

Report from a laboratory experiment conducted on?? 17-MAY-17 As part of vibration lab

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#### Abstract:

Absorption dynamics, mechanical subsystem to reduce or eliminate unwanted vibrations in machines used.

This method has proven particularly on machines with the natural frequency of the vibration amplitude due to proximity to high frequency stimulation was And the frequency of the harmonic force or natural frequency cannot be changed any system is of great importance.



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#### 1. Introduction and Background

The study of the absorption of vibrations in a vibrating system by adding a sub-system Franc matches the natural frequency of stimulation

#### 2. Theory

Absorption dynamics, mechanical subsystem to reduce or eliminate unwanted vibrations in the car

Is used. This method has proven particularly on machines with the natural frequency of the vibration amplitude due to their proximity to

Stimulation frequency (resonance) has been very high frequency harmonic force or natural frequency of the system

None cannot be changed is of great importance.

#### 3. List of Equipment Used

. If the system a degree of freedom (Original) consisting of mass m1 and spring stiffness coefficient k1 and the driving force

Sin  $\omega$  t f0 = F, subsystem consists of the mass m2 and spring stiffness coefficient k2 add, the new system has two degrees

M1 and m2 is free and equilibrium equations are as follows:

$$m_1 \ddot{x}_1 + k_2 (x_1 - x_2) + k_1 x_1 = f_0 \sin \omega t$$

$$m_2\ddot{x}_2 + k_2(x_2 - x_1) + k_1x_1 = 0$$

That we have to solve them:

$$\frac{\frac{x_1}{x_0}}{x_0} = \frac{\frac{1-\omega^2}{\omega_{22}^2}}{\left(1+\mu\beta^2 - \frac{\omega^2}{\omega_{11}^2}\right)\left(\frac{1-\omega^2}{\omega_{22}^2}\right) - \mu\beta^2}$$
$$\frac{\frac{1-\omega^2}{\omega_{22}^2}}{\left(1+\mu\beta^2 - \frac{\omega^2}{\omega_{11}^2}\right)\left(\frac{1-\omega^2}{\omega_{22}^2}\right) - \mu\beta^2}$$

#### 4. Procedure

The experimental device as shown below one end of a beam forming roller door and one end of the connection is in the middle of a



There is an external harmonic. Sub-absorbing system consists of two steel blade and two weights for the crime that is

The adjustable distance on both sides of the blade are closed.

#### 5. Data

W1=400gr far way=484 W2=800gr far way=833 Without Weighte far way=876

Without Weights far way=876

With the addition of Dynamic Vibration Absorber far way=700

While the absorbent is not connected to the system, speed control device to turn on and turn the key, the engine speed

Has worked to gradually reach their critical remote device. In this case, we note the engine speed. Turn off the power or speed without change, in a shock absorber on the engine and on-site installation

And then two minor offense at the same time and the same distance from each other and move so that the maximum vibration

Main system be eliminated. The distance subsystem mass (center of mass to the beginning of the chain) to be measured. 1 -Franz natural formula with experimental values are obtained and compare and get the error percentage.

2 -Malta governing the vibration system to obtain two degrees of freedom.

3 -Few examples of using Dynamic Vibration Absorber name.

#### 6. Discussion of Results

Cable bridges absorb vibration damper using. Prevent the creation of vortices waves in a cable or set of cables. It can be adjusted to the exact distance from the base of the mass of the blades can be sub frequencies with fewer errors than

Set the natural frequency of the beam.

#### 7. Conclusions

In this experiment, we noticed that the engine is mounted on the beam and harmonic force for a system of compulsory

The freedom to create, by setting the natural frequency of the second sub-system which, like the first system but in opposite fashion

Moves, we can create a sub-harmonic force, its frequency with a natural frequency of vibration of the beam and

Vibration absorb and neutralize the natural frequency of the excitation frequency and there's distancing absence resonance

it is possible.



#### 8. References

http://ui.ac.ir/ShowPage.aspx?page\_=form&order=show&lang=1&sub=11&PageId=4475&Page IDF=4422&tempname=fannei

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