DOS2021: Tuned Vibration Absorbers

Number of participants: 14

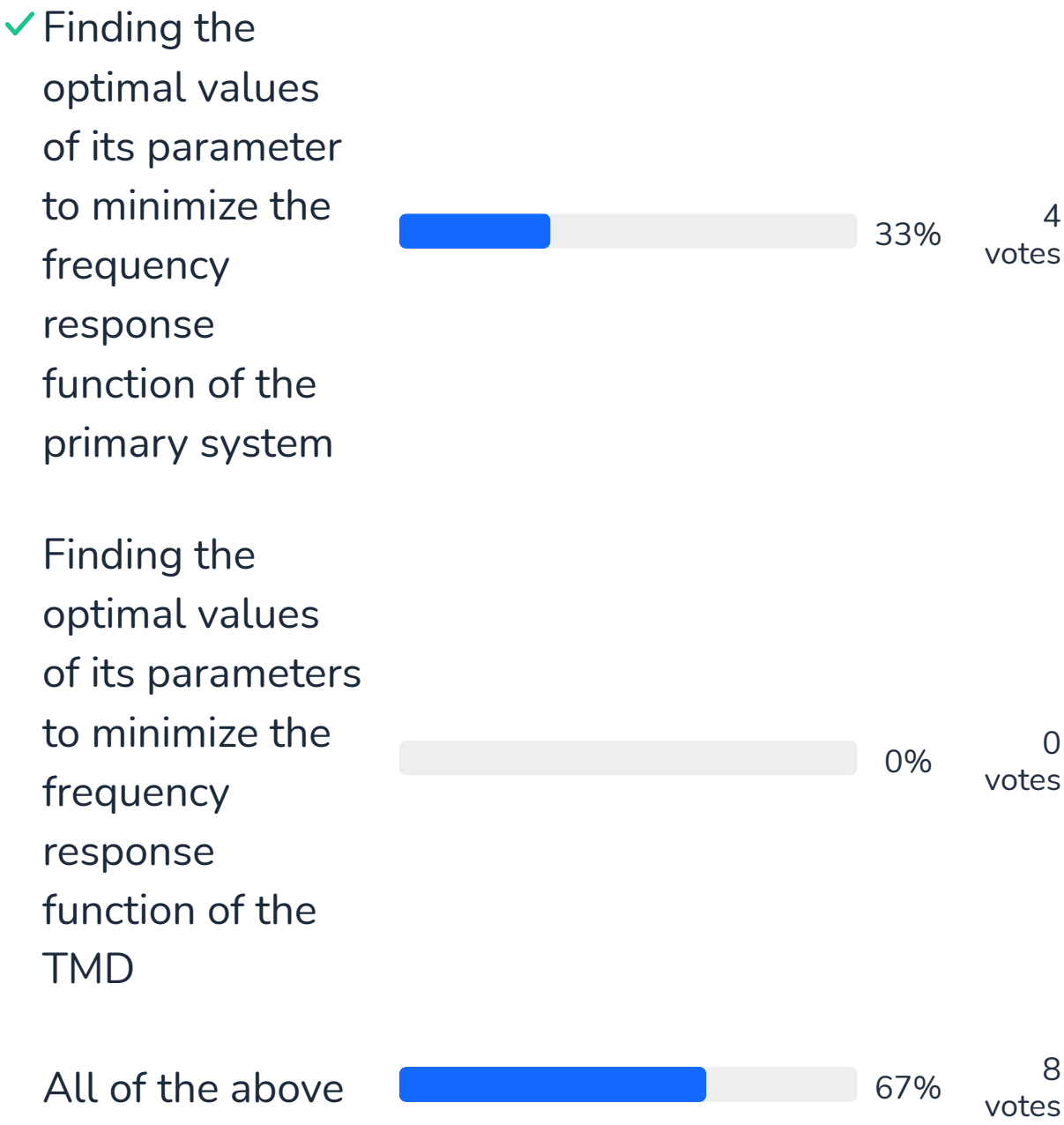
1

A tuned mass damper is

A viscoelastic damping layer added to a system	0%	0 votes
A hydraulic damper used to dissipate energy in a system	0%	0 votes
✓ An auxiliary dynamic system designed to absorb the energy in a narrow frequency band around the natural frequency of the primary system	100%	11 votes

2

Tuning of a TMD consists in



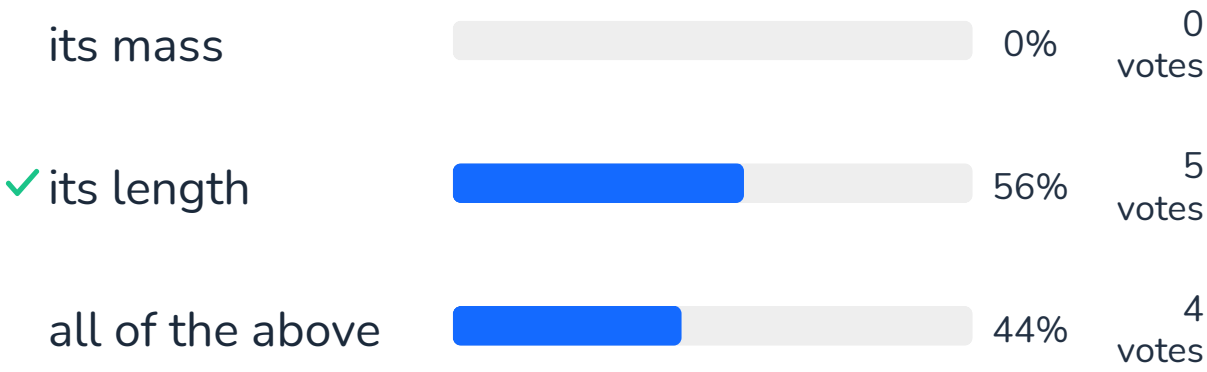
3

Adding an undamped TMD to a structure introduces an anti-resonance

✓ At the natural frequency of the TMD		18%	2 votes
At the natural frequency of the structure		27%	3 votes
✓ At the natural frequency of both if these frequencies are equal		64%	7 votes

4

In order to tune the frequency of a pendulum TMD, one needs to change



5

The figure represents the FRF of a structure to which a damped TMD is attached, where the natural frequency of the TMD is exactly tuned to the natural frequency of the structure. Is this an optimal tuning ? Why ?

P and Q have to be at equal level

Yes, little movement at resonance

No,level of P and Q should be same.

At the point of intersection

Yes this is optimum coz pt P and Q are more or less of same ht.

Yes

6

What is the procedure to make an optimal tuning of a TMD for any given structure ?

7

In order to design a TMD and find its optimal parameters, the procedure to follow is (put in the right order)

- Define the mass of the TMD (do not exceed a few % of the total mass of the main structure)
- Choose a natural frequency of the system to be damped
- Determine the damping coefficient of the TMD using Den Hartog's rule xi=sqrt(3mu/(8(1+mu)))
- Determine the stiffness of the TMD using Den Hartog's rule nu=1/(1+mu)
- Reduce the system to a SDOF system using single mode approximation (Keq, Meq).