DOS: Tuned Vibration Absorbers

Number of participants: 11

1. A tuned mass damper is

8 correct answers
out of 8 respondents

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%	8 votes

2. Tuning of a TMD consists in

6 correct answers
out of 7 respondents

✓	Finding the optimal values of its parameter to minimize the frequency response function of the primary system	86%	6 votes
	Finding the optimal values of its parameters to minimize the frequency response function of the TMD	0%	0 votes
	All of the above	14%	1 vote

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

0 correct answer
out of 7 respondents

✓	At the natural frequency of the TMD	0%	0 votes
	At the natural frequency of the structure	100%	7 votes
✓	At the natural frequency of both if these frequencies are equal	14%	1 vote

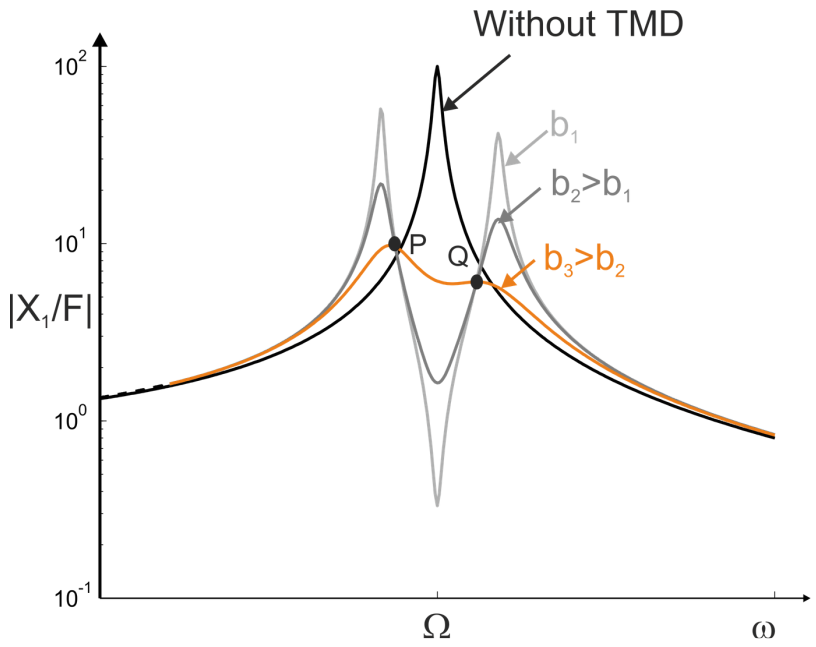
4. In order to tune the frequency of a pendulum TMD, one needs to change

3 correct answers
out of 7 respondents

	its mass	14%	1 vote
✓	its length	43%	3 votes
	all of the above	43%	3 votes

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 ?

0 correct answer
out of 5 respondents



No because P and Q are not at the same height

no because P and Q aren't at the same height

No bcs P and Q don t have equal height

Non

No, because P and Q aren't aligned

Correct answer

It is not an optimal tuning, it can be improved by taking P and Q at the same height

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

0 correct answer
out of 1 respondent

-compute the maximal mass - tuned the frequency of the TMD -compute the stiffness of the TMD - compute the damping and deduce b

Correct answer

Reduce the model to a SDOF system using a single mode approximation, and then use the analytical formulae of Den Hartog

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

1 respondent

Most frequent combinations:

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

Correct answer

2	Define the mass of the TMD (do not exceed a few % of the total mass of the main structure)	0
3	Choose a natural frequency of the system to be damped	0
5	Reduce the system to a SDOF system using single mode approximation (Keq, Meq).	0
1	Determine the stiffness of the TMD using Den Hartog's rule nu=1/(1+mu)	1
4	Determine the damping coefficient of the TMD using Den Hartog's rule xi=sqrt(3mu/(8(1+mu)))	1