VIB: Tuned Vibration Absorbers

Number of participants: 15

1. A tuned mass damper is

7 correct answers
out of 8 respondents

	Answer	%	Votes
	A viscoelastic damping layer added to a system	13%	1 vote
	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	88%	7 votes

2. Tuning of a TMD consists in

7 correct answers
out of 11 respondents

✔	Finding the optimal values of its parameter to minimize the frequency response function of the primary system	**64%**	7 votes
	Finding the optimal values of its parameters to minimize the frequency response function of the TMD	**9%**	1 vote
	All of the above	**27%**	3 votes

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

1 correct answer
out of 9 respondents

	Answer	%	Votes
✔	At the natural frequency of the TMD	22%	2 votes
	At the natural frequency of the structure	67%	6 votes
✔	At the natural frequency of both if these frequencies are equal	33%	3 votes

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

5 correct answers
out of 11 respondents

	Answer	%	Votes
	its mass	27%	3 votes
✔	its length	45%	5 votes
	all of the above	27%	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 4 respondents

No, the optimal is when P and Q are at the same heigth.

No, Q and P not at the same height

Yes, but there is a better way to tune it when q and p are on the same level

Yes

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

Find mu, v, k and damping

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)

10 respondents

Most frequent combinations:

3 respondents ✗

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

2 respondents ✗

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

1 respondent ✗

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

Correct answer

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